Th. Sect.

ENDEMIC GOITRE

With special reference to Intestinal Toxaemia as a factor in its causation.

THESIS

submitted for the M.D. Edinburgh

by

MD

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INTRODUCTION.

The study of the thyroid gland has become such an oft repeated theme already that one must crave the indulgence of the reader for bringing up the matter for discussion once more. To anyone, who makes even a hurried perusal of medical literature, it is obvious what amount of attention has been given to the subject. The reason for it is not far to seek because this disease of the thyroid gland can be found in most of the countries of the world at some period or other, and in spite of much patient research the matter still remains a highly controversial subject. If one happens to reside in an area where goitre is at all prevalent it is obvious that it will require much of one's attention in the direction of diagnosis, prognosis, treatment, and lastly but not least its aetiology. Not only do cases present themselves time and again for treatment, but they can be seen in most of the parts in this neighbourhood, regarding it as merely one of those thousands of ills to which human flesh is heir. To anyone not familiar with this part of the world this prevalence of the disease is particularly striking, especially if the observer comes from a region where it is rarely, if at all seen.

Standing at the corner of a street in either the towns or villages of South Durham and North Yorkshire these cases can be counted by the scores. In fact it is so common a sight to the laity that little attention is paid to it. This combined with the fact that pain is not a characteristic of the disease leads to an apathy for skilled advice. Nevertheless, it is a matter which should be brought to a speedy termination because it is a disease that has been well studied, and one which proper measures can and will succeed in overcoming. The presence of goitre is itself not only a danger to the unfortunate individual stricken by it, but also to those who are free from it. Undoubtedly the disease may be acquired from goitrous cases through contact or congenitally. In the former it causes much suffering from disfigurement, pressure effects, malignancy, and in the latter to imbecility, cretinism and otherwise mentally and physically defective children. Taking this into consideration, it is all the more imperative that efficient means be taken to rid humanity of this disease. In order to stress the matter a little it is advantageous to recapitulate a few facts about it. The large number of cases are themselves so striking that one is forced to grapple with the disease whether you want to or not. It is a cause of much human suffering by virtue of its disfugurement, its

mechanical effects, the danger of malignant disease, as a cause contributing towards imbecility and insanity, from the public health point of view and from the fact that if efficient measures are carried out sufficiently early, the disease can be prevented and alleviated in the latter case without surgical measures.

The term goitre is applied to any non-inflammatory enlargement of the thyroid gland, causing a general or local enlargement, chronic in type and occurring either sporadically or endemically. The enlargement is essentially the mode of reaction of the gland to stimulation, be it nervous, microbic or metallic in nature acting either multiply or singly. As has been pointed out the mode of response to stimulation is to all intents and purposes the same, although the nature of the stimulus varies greatly. The term goitre itself is derived from the corrupted Latin word GUTTER - throat, and is used largely in French and Swiss circles. No one name, however, seems to have received general acceptance, owing to the world wide nature of the disease, and its nomenclature will therefore vary according to the fancies and beliefs peculiar to each particular region. Besides the term goitre the synonym tracheocele was used owing to the erroneous impression that the tumor contained air and arose from the trachea. Another is Bronchocele, but this

is still more objectionable in as much that no thyroid tissue is normally found around the terminations of the trachea. The word Thyrocele is used by Robinson in his article on goitre (pp. 1. Chap.1.) because it marks the site viz. the thyroid, and one of its chief characteristics viz. swelling. Other synonyms are Yorkshire neck, Derbyshire neck, Nithsdale neck, thick neck, Thyropraxia (Alibert) or simply hypothyroidism as opposed to hyperthyroidism. It should, however, be understood, in order to avoid confusion, that it is proposed to deal only with the condition known as endemic or parenchymatus goitre, and that whatever name it may be called by, it is essentially the same disease in every case.

We next turn our attention to the symptoms of the disease. These in the majority of cases of simple goitre are slight, but in order to make the symptomatology complete it is proposed to deal also with the more dangerous symptoms also. There may may be no symptoms whatever, the patient not being aware of the enlarged thyroid, and it may only be discovered in the course of another illness, or after some flesh has been lost about the neck. Why the disease is not seen more often in its earlier stages is because in the majority of cases at this stage there is merely a general rounding of the

neck anteriorly which is attributed to putting on of flesh, and is looked on with a certain amount of pride. In females the prominence of the thyroid is first noticed on throwing the head backwards whilst combing or brushing the hair, and in the vast majority of cases it is this enlargement with its disfigurement that makes them seek medical advice. In none of the cases seen here has there been any history of dyspnoea or hoarseness of voice directly attributable to the goitre. Still they do occur, and it is proposed to deal with them. Other symptoms are dysphagia from pressure on the oesophagus, giddiness, headache, noises in the ears from pressure on the large blood vessels of the neck, irregularity or stoppage of the menses and anaemia. We now deal with them seriatim. About the pressure symptoms it may be advantageously stated here that the size of a goitre bears no direct relation to its pressure symptoms, but that the latter are influenced by (1) the site of the tumour, (2) its mode and direction of growth, (3) the state of the muscles and fasciae of the neck. The first pressure symptom to be considered is dyspnoea because it is the most dangerous. It may be caused by goitres of all sizes and depends largely on their situation together with any or all of the factors mentioned above. Of those situated behind the manubrium sterni, readily cause

dyspnoea. The same holds good to a lesser extent in cases where the muscles and fasciae of the neck are resistant as in males. Now the trachea may be compressed from both sides where both lobes have enlarged, and its lumen reduced to a narrow slit, the so called Scabbard trachea. In unilateral enlargements the trachea is pushed over to the opposite side and elongated. Especially in cases where the tumor has become calcareous, pressure atrophy and fatty degeneration may cause softening of the trachea - the so called Trachea malacia, which may remain latent and cause death from asphyxia if (a) there is a sudden increase in pressure (b) sudden movement of the head from its accustomed position (c) the decrease in the size of the goitre which has acted as a splint for the softened cartilages. In addition it has to be remembered that a persistent thymus is often present and may itself cause sudden death.*
The dyspnoea is usually worst on exertion and when in the dorsal position or any superadded catarrhal condition of the trachea. The mucus membrane at the site of compression is usually much thickened and in a catarrhal state from the irritation caused by the pressure, and it will therefore contribute towards diminishing the air entry into the lungs. There are therefore two forces at work simultaneously

* Prof. Rose. Der Kropftod und die Radicalcin der Kopfte.

(1) pressure from irritant on the trachea,

(2) Thickened catarrhal mucus membrane of the trachea as a secondary factor.

We next study the air entry into the lungs in this state of affairs. Owing the narrowing of the trachea the amount of air entering the lungs is in direct proportion to the amount of obstruction, and this in turn will affect the relation of the gases to the blood and through it the circulation. As regards oxygen content of the blood there is no alteration because the absorption of O_2 into the blood does not follow the law of pressure absorption, and at the same time the tension of the air in the venus blood of the pulmonary artery in cases of tracheal obstruction remains below that in the pulmonary air. There is therefore no want of oxygen by the tissues. As, however, the air in the lungs is not sufficiently often renewed there results an accumulation of carbon dioxide in the blood which has the effect of stimulating the respiratory centre. This centre attempts to rid itself by increasing the rate and depth of the respirations. Should it fail there results the state of carbon dioxide poisoning of the tissues. From this it may be seen that tracheal compression may cause death

(a) suddenly from collapse of the trachea,

(b) gradually from carbondioxide poisoning.

The effect on the circulation is secondary to the decreased air entry into the lungs and is produced as follows. The alveolar spaces of the air cells not being subjected to the normal amount of pressure a certain amount of collapse of the lungs results, and in these collapsed areas there results a passive congestion from the dilatation of the capillaries in the alveolar walls, distention of the alveolar epithelium and oedema into the alveolar spaces. Thus there is produced a resistance to the circulation through the lungs which tells back on the right verticle of the heart. This together with the saturation of the blood by carbon dioxide leads to impaired function if not complete heart failure. We see therefore that the dyspnoea may be caused by the following factors :-

(1) compression from without,

(2) swelling and spasm of the mucosa of the trachea,

(3) saturation of the blood with carbon dioxide,

(4) embarrassment of the heart muscle.

Dysphagia is rare compared to dyspnoea and may be produced in three ways :-

(1) where the left lobe of the thyroid is chiefly enlarged and presses on the trachea as it crosses over to the left in the neck,

(2) through the tracheal rings,

(3) where the goitre is situated in the lingual thyroid.

Dysphagia is commonest in retrosternol goitres.

As regards the production of hoarseness or loss of voice there is no difficulty in understanding its mode of production if a few anatomical points are borne in mind. The vocal cords possess two antagonistic muscles, the abductors and the adductors; but the adductors like the flexors in other parts of the body are the more powerful, and are less liable to suffer from paralysis. The recurrent laryngeal nerve supplies both of these muscles, and passes upwards on each side behind the lobes of the thyroid lying between the trachea and oesphagus. The paralysis is usually unilateral and incomplete. At first, the abductor muscles only are affected. This causes the huskiness of voice. Later the adductors also become involved, in which case the voice is lost. Looking at the blood supply of the muscles - the abductors of which the post-cricoarytaenoids are commonly paralysed, it seems possible that anischaemia may be the cause of the paralysis. The post-cricoarytaenoids are supplied by the inf. laryngeal artery, a branch of the inferior thyroid only. Pressure on this artery would therefore give rise to anischaemia leading to an interstitial fibrosis and a consequent loss of function. The arguments against this theory are

are however too obvious, because owing to the free anastomosis a collateral circulation would easily be established. In the second place, where the recurrent laryngeal nerve is pressed on in the thorax, where the inf. laryngeal artery could not be affected, paralysis results in spite of an intact vasular supply.

Distrubances of the menses are very common in endemic goitre, either complete amenorrhoea or simply an irregular course. This is believed to be due to the so called "sympathetic action" of the thyroid gland, and is therefore a result of the disease. Anaemia has also been observed, but further reference to the condition of the blood will be made when the pathology of the disease is discussed. Whether the features of cretinism should be included under this heading is a much mooted point because they are found in cases where the thyroid secretion is absent owing to goitrous disease of the gland, but they really belong to a separate entity. On looking at the neck of a goitrous individual, it will be seen that in the early stage of the disease there is a fullness of the neck anteriorly with the sterno mastoids standing out more prominently than usual. On bending the head back the swelling may be brought out better especially in the act of swallowing. This is all that may be seen in

in early cases. If more advanced there is a horse shoe shaped swelling in the position of the thyroid, more prominent on the right side which moves up and down with deglutition. The swelling is freely moveable transversely but not vertically, owing to the arrangement of the pretracheal fascia. The tumor is smooth or slightly lobulated on the surface, soft, painless and not adherent to the skin. It is the right lobe that is usually but not invariably the larger, the left lobe or the isthmus may be the only sign of enlargement. The lobes extend from about the level of the hyoid bone to a variable distance above the clavicles. Some dilated veins are often visible also. In advanced cases there is a large round swelling projecting down in front of the neck over the sternum for about three inches, and almost the size of a foetal head. It is firm in consistence, smooth in contour, painless to the touch, but moves only slightly with deglutition. No pulsation can be felt, and no murmurs heard over it. In cystic goitre there is a globular swelling or swellings presenting fluctuation and confined to one or other lobe. In adenoma of the gland there is a tumor localised to one part of the gland, whereas the rest is normal. Fluctation may be present. Malignant disease may be superadded to a simple goitre and then presents the following features:-

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Of the cases that have been observed here fifty are selected for special study. This does not, however, represent the total number of cases occurring in this neighbourhood, but only those on whom I have been able to keep an eye regularly, and who are at all interested in their treatment. Of this number 15 are males and 35 are females, their ages varying from 6 to 67 years. Of the 15 males in 3 the isthmus formed the most prominent part of the goitre, and in 4 the left lobe. In 7 of them the mother was goitrous, and more than one member of the family was affected. The majority of these cases were born and lived in this goitrous area. No signs of cretinism was detected amongst them. Of the 35 females more than half belonged to the period from puberty to the menopause. In 4 cases one or other parent was goitrous and the child was born and lived in this area. In 10 no history of

goitre in either parent or any other member of the family was found. One case, 6 years of age, showed signs of cretinism, but was the third generation of goitre. The remaining twenty were emigrants from a non-goitrous area, and developed the disease here. No history of goitre in the parents or other members of the family. The area in which these cases reside is chiefly coal mining. The houses are built on the "back to back" principle forming the well known series of colliery rows. There is a considerable amount of overcrowding, but the houses themselves are fairly good and clean. Large families are the rule, and much intermarriage at an early age. The sanitation leaves much to be desired in the direction of disposal of human excretion. The system in vogue is the "dry latrine" which is removed from time to time and used as manure.

HISTORICAL OUTLINE.

The study of the history of goitre is like studying the history of the human race. In the ancient medical writings according to Hirsch[1] there are abundant references to tumors of the neck, but no reference is made as to their nature. From the descriptions, however, it is justifiable to conclude that goitre was not unknown even then, although no reference is made to its endemicity. The Arthorva[2] Veda - an ancient Hindu collection of incantations dating from 2000 B.C.-contains extensive forms of exorcisms for Goitre. Caesar[3] mentions the frequent occurrence of "big neck" as one of the peculiarities of the Gauls. The origin of the term cretin shows the familiarity of the early Romans with the disease. They originated the word as an expression of contempt by calling the myxoedematous idiots Christians. The failure of the Greek and Roman physicians to study the endemicity of the disease was due to the fact that they had little opportunity of studying it in its endemic areas, and perhaps also that they took slight interest in the study of epidemic and endemic diseases in general. From the statements of Pliny[4] it is evident that there were endemics of goitre in the Alps even in his time (B.C. 460).

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The 1st half of the mediaeval period furnishes no medical account of endemic goitre, but a few references are to be found in some of the "Lives of the Saints"; the disease being regarded in those days as a punishment from God, and there are stories of its cure by the King's hand.* [5] Hinkman in his account of the life of St, Remi (lib. Vlll) states that when a famine threatened in the country around Rheims in the 5th century, the Saint caused wheat to be ground for distribution among the poor, but the Kelts being possessed of the devil burnt the mills, whereupon the Saint pronounced his anathema on them. "Omnes qui hoc egerunt, et qui de eorum germine nati sunt, fiant viri strumosi et feminae guttorosae". [6] A similar legend is given by Hubert in the life of St, Gudula, The Bishop Emebert in the 7th century delivered an anathema upon the wicked people who had despoiled the tomb of that saint, the curse being that their offspring should all be cripples and the women goitrous. Hubert, who was Bishop of Liege at the beginning of the 8th century adds. "et permanent hodie guttorosae mulctati."

* The Kings of England and the crowned and annointed Kings of France were thought to possess the power of curing certain diseases by touching the patient whilst murmuring the words "Le Roy te touche, Dieu te guerisse."

Towards the end of the 13th century there is an account by Marco Polo[7] of its prevalence in Yarkand and other regions of the Central Asian plateau. In the 14th and 15th century are the first medical references to endemic goitre by Arnoldus Villanovanus[8] "Nascitur in Gula quandoque passim, que botium dicetur, fiunt nempe in quibusdam regionibus forte ex natura aeris vel aquarum in quibus quasi omnes mulieres vel viri sunt strumosi, sicut est quaedam regio quae est in comitatu civitatis Lucae, quae dicitur". . (Brevier ' Liv.II, Cap.IV. Opp.Basil 1585, 1190.)And by Valescius de Travanta "Botium est morbus proprius aliquibus regionibus sicut est Savate in comitatu Fuxi, et hoc est ratione regionibus, aut ratione aquarum frigidarum quas bibunt et est morbus hereditarius". ('Philonium' Liv.VIII. Cap 31. Lugd 1490 Fol. 338") Next there is an account of the disease in the Duchy of Salzburg by Paracelsus[9] who treated the subject with thoroughness on the basis of his own observations. He described the disease briefly and indicated its relationship to cretinism. In the 16th, 17th and 18th century there appeared numerous writers of whom we may mention, Munster "Cosmographia Univ." Basil 1550 V.L.", Agricola "De rerum metallica Basil 1657, 542 and Ortelius, "Theatrum orbis terrarum Ant. 1570, 92", amongst others. Towards the end of the 18th century there appeared the first important work on the subject by Malacarne[10]

"Sui Gozzie Sulla Stupidita, Tor. 1789", based on his observations in the valley of the Aosta and from this time scientific inquiry may be said to have begun. Amongst the ancients who studied the disease may be mentioned Hippocrates[11] B.C,460, who ascribed it to the drinking of snow water laying stress on the coldness thereof. The father of medicine - Galen, and a lesser light - Celsus concurred with this opinion. Pliny was the first to mention its occurrence in mountainous regions, but the Arabian physician Albacasis[12] in the 11th century described the disease comparing it to the dewlap of a turkey cock. This observation was expressed by Shakespeare as follows: "Who would believe that there were mountaineers developed like bulls, whose throats had hanging at them wallets of Flesh. (Temp. Act III. Sc. 3).

As regards the functions of the thyroid, the Greeks considered it merely a diverticulum from the trachea to hold air, and to goitre they gave the name Bronchocele founded on this view. Others thought it was closely related to the cerebral hemispheres in preventing a congestion of the latter. Each lobe corresponded to each cerebral hemisphere with which it was associated. Still others considered it merely to round off the neck to give it a graceful appearance. To the thyroid was attributed an

association with sleep during which it would swell up. Its intimate association with the organs of generation was pointed out by Woakes (on the pathogeny and treatment of Goitre. Lancet. March 19. 1881), who believed that there were vasomotor paths existing between the nedk and the genitals as evidenced by the voice breaking in boys and the functional aphonia of girls at puberty. This has been put to a practical test as follows by the old Roman matrons. The day before the wedding it was customary for the bride's mother to measure her daughter's neck and again the following morning, any indications of enlargement being evidence that the newly wedded pair had done themselves justice in the interval; and according to Berard more than one Roman husband measured the virginity of his wife by the length of the thread round her neck.

In the middle ages Paracelsus would have us believe that mineral impurities e.g. sulphide of iron was the cause of Goitre and this view was entertained by St. Léger as recently as 1867. During the 17th century there appeared "an account of the method of cure of Bronchocele or Derbyshire neck in Coventry" by Prosser. Fodere wrote in the 18th century and maintained that goitre was the first step towards cretinism.

Other well known workers were Quadir of Naples

1817, Alibert of Paris 1817, Coindet of Geneva 1821, and Straub 1821. In 1825 appeared Parry's[14] description of cases of goitre in connection with palpitation of the heart and exopthalmos. Graves[15] described exopthalmic goitre in 1835 and Basedow's description of the same disease appeared in 1840 but none of them interpreted their findings in terms of the thyroid.

The first important observation of the functions of the thyroid was published in 1874 by Sir William Gull who discussed myxoedema in detail, interpreting his findings in terms of deficiency of the thyroid. These observations were confirmed in 1880 and 1881 by Kocher and Reverdin who had observed the results of total thyroidectomy, Kocher calling it Cachexia Strumeprivax and Reverdin operative myxoedema. In 1877 Ord designated the disease Myxoedemya because he thought he recognised a mucoid change in the tissues. Sir Victor Horsley verified these findings by experimental production of myxoedemya in monkeys. In 1891 Murray and McKenzie gave glycerinated extract of thyroid to a myxoedematous patient with definite results. The first account of an epidemic of goitre occurred in France[16] in 1783 when a regiment of soldiers on being stationed at Nancy developed goitre. In 1815 an epidemic occurred in a college in Strasburg and further epidemics broke out amongst the troops in France during 1847. In 1853 Chaten expressed the

view that goitre was essentially due to a deficiency of iodine in the air and water because it did not occur in areas where iodine was plentiful. Maumene (@rch. Gen. de Med. 1866) came to the conclusion that fluorine gave rise to goitre as it was plentiful in the soil of the Pyrenees where he had studied the disease. To test his view he fed a cat on fluoride of potassium for five months. Towards the end of that time the cat ran away, and on its recapture three years after the tumor was still present in its neck, which on dissection by Professor Gartell of Rheims was found to have no relation to goitre.

In 1874 Baillager showed that there were in France no less than 500,000 goitrous persons and 122,700 cretins and idiots. The disease was most rampant in mountainous regions in contrast to the plains where it was so scarce that it appeared to occur only sporadically. He further observed that goitre did not necessarily confine itself to these regions but had spread to parts where it was formerly unknown - e.g. the Ardennes. From his study of 52,849 cases he noticed that the proportion of women to men sufferers varied according to the severity of the endemic, being less marked when mild and more so when severe, but this did not apply to the plains. Goitre did not confine itself to any particular soil, but showed prevalence to the

dolomite and less to other parts. Seeking the cause in water he found by chemical analysis that there was nothing to show why this should be so. In 1867 St, Léger formed the opinion that goitre did not necessarily confine itself to mountainous regions as he found it equally common in the plains of Lombardy of the Danube and of Upper and Lower Austria. He concurred with Baillager that where the disease was slight it affected the women mainly. The cause, however, he maintained lay in potable waters containing the sulphide of iron in a form readily convertible into the sulphate. This supposition is absolutely necessary for his theory because the sulphate of iron is insoluble in water. To show the truth of his views he states that in Italy and France the drinking of waters from certain goitrous wells is resorted to so as to avoid military conscription. Furthermore in 1772 the crew of Captain Cook on running short of water collected ice, which was melted in iron vessels. Those who drank of it developed goitre, the rest escaped. MacNamara in 1880 described the occurrence of goitre in the plains of the Ganges. To it he attributed a malarius origin, seeing that it was associated with damp and marshy soils, and made its appearance during and after the rains. In 1881 Woakes put forward his vaso motor paresis theory. He believed that goitre was due to

(3) where the goitre is situated in the lingual thyroid.

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The study of the history of goitre is like studying the history of the human race. In the ancient medical writings according to Hirsch[1] there are abundant references to tumors of the neck, but no reference is made as to their nature. From the descriptions, however, it is justifiable to conclude that goitre was not unknown even then, although no reference is made to its endemicity. The Arthorva[2] Veda - an ancient Hindu collection of incantations dating from 2000 B.C. contains extensive forms of exorcisms for Goitre.[3] Caesar mentions the frequent occurrence of "big neck" as one of the peculiarities of the Gauls. The origin of the term cretin shows the familiarity of the early Romans with the disease. They originated the word as an expression of contempt by calling the myxoedematous idiots Christians. The failure of the Greek and Roman physicians to study the endemicity of the disease was due to the fact that they had little opportunity of studying it in its endemic areas, and perhaps also that they took slight interest in the study of epidemic and endemic diseases in general. From the statements of Pliny[4] it is evident that there were endemics of goitre in the Alps even in his time (B.C. 460).

"Guttur homini tantum et suibus intumescit, aquarumque potantur plerumque vitio".

The 1st half of the mediaeval period furnishes no medical account of endemic goitre, but a few references are to be found in some of the "Lives of the Saints"; the disease being regarded in those days as a punishment from God, and there are stories of its cure by the King's hand.* [5] Hinkman in his account of the life of St, Remi (lib. Vlll) states that when a famine threatened in the country around Rheims in the 5th century, the Saint caused wheat to be ground for distribution among the poor, but the Kelts being possessed of the devil burnt the mills, whereupon the Saint pronounced his anathema on them. "Omnes qui hoc egerunt, et qui de eorum germine nati sunt, fiant viri strumosi et feminae guttorosae". [6] A similar legend is given by Hubert in the life of St, Gudula, The Bishop Emebert in the 7th century delivered an anathema upon the wicked people who had despoiled the tomb of that saint, the curse being that their offspring should all be cripples and the women goitrous. Hubert, who was Bishop of Liege at the beginning of the 8th century adds."et permanent hodie guttorosae mulctati."

* The Kings of England and the crowned and annointed Kings of France were thought to possess the power of curing certain diseases by touching the patient whilst murmuring the words "Le Roy te touche, Dieu te guerisse."

Towards the end of the 13th century there is an account by Marco Polo[7] of its prevalence in Yarkand and other regions of the Central Asian plateau. In the 14th and 15th century are the first medical references to endemic goitre by Arnoldus Villanovanus[8] "Nascitur in Gula quandoque passim, que botium dicetur, fiunt nempe in quibusdam regionibus forte ex natura aeris vel aquarum in quibus quasi omnes mulieres vel viri sunt strumosi, sicut est quaedam regio quae est in comitatu civitatis Lucae, quae dicitur". . (Brevier ' Liv.II, Cap.IV. Opp.Basil 1585, 1190.)And by Valescius de Travanta "Botium est morbus proprius aliquibus regionibus sicut est Savate in comitatu Fuxi, et hoc est ratione regionibus, aut ratione aquarum frigidarum quas bibunt et est morbus hereditarius". ('Philonium' Liv.VIII. Cap 31. Lugd 1490 Fol. 338") Next there is an account of the disease in the Duchy of Salzburg by Paracelsus[9] who treated the subject with thoroughness on the basis of his own observations. He described the disease briefly and indicated its relationship to cretinism. In the 16th, 17th and 18th century there appeared numerous writers of whom we may mention, Munster "Cosmographia Univ." Basil 1550 V.L.", Agricola "De rerum metallica Basil 1657, 542 and Ortelius, "Theatrum orbis terrarum Ant. 1570, 92", amongst others. Towards the end of the 18th century there appeared the first important work on the subject by Malacarne[10]

"Sui Gozzie Sulla Stupidita, Tor. 1789", based on his observations in the valley of the Aosta and from this time scientific inquiry may be said to have begun. Amongst the ancients who studied the disease may be mentioned Hippocrates[11] B.C,460, who ascribed it to the drinking of snow water laying stress on the coldness thereof. The father of medicine - Galen, and a lesser light - Celsus concurred with this opinion. Pliny was the first to mention its occurrence in mountainous regions, but the Arabian physician Albacasis[12] in the 11th century described the disease comparing it to the dewlap of a turkey cock. This observation was expressed by Shakespeare as follows: "Who would believe that there were mountaineers developed like bulls, whose throats had hanging at them wallets of Flesh. (Temp. Act III. Sc. 3).

As regards the functions of the thyroid, the Greeks considered it merely a diverticulum from the trachea to hold air, and to goitre they gave the name Bronchocele founded on this view. Others thought it was closely related to the cerebral hemispheres in preventing a congestion of the latter. Each lobe corresponded to each cerebral hemisphere with which it was associated. Still others considered it merely to round off the neck to give it a graceful appearance. To the thyroid was attributed an

association with sleep during which it would swell up. Its intimate association with the organs of generation was pointed out by Woakes (on the pathogeny and treatment of Goitre. Lancet. March 19. 1881), who believed that there were vasomotor paths existing between the neck and the genitals as evidenced by the voice breaking in boys and the functional aphonia of girls at puberty. This has been put to a practical test as follows by the old Roman matrons. The day before the wedding it was customary for the bride's mother to measure her daughter's neck and again the following morning, any indications of enlargement being evidence that the newly wedded pair had done themselves justice in the interval; and according to Berard more than one Roman husband measured the virginity of his wife by the length of the thread round her neck.

In the middle ages Paracelsus would have us believe that mineral impurities e.g. sulphide of iron was the cause of Goitre and this view was entertained by St. Léger as recently as 1867. During the 17th century there appeared "an account of the method of cure of Bronchocele or Derbyshire neck in Coventry" by Prosser. Fodere wrote in the 18th century and maintained that goitre was the first step towards cretinism.

Other well known workers were Quadir of Naples

1817, Alibert of Paris 1817, Coindet of Geneva 1821, and Straub 1821. In 1825 appeared Parry's[14] description of cases of goitre in connection with palpitation of the heart and exopthalmos. Graves[15] described exopthalmic goitre in 1835 and Basedow's description of the same disease appeared in 1840 but none of them interpreted their findings in terms of the thyroid.

The first important observation of the functions of the thyroid was published in 1874 by Sir William Gull who discussed myxoedema in detail, interpreting his findings in terms of deficiency of the thyroid. These observations were confirmed in 1880 and 1881 by Kocher and Reverdin who had observed the results of total thyroidectomy, Kocher calling it Cachexia Strumeprivax and Reverdin operative myxoedema. In 1877 Ord designated the disease Myxoedemia because he thought he recognised a mucoid change in the tissues. Sir Victor Horsley verified these findings by experimental production of myxoedemia in monkeys. In 1891 Murray and McKenzie gave glycerinated extract of thyroid to a myxoedematous patient with definite results. The first account of an epidemic of goitre occurred in France[16] in 1783 when a regiment of soldiers on being stationed at Nancy developed goitre. In 1815 an epidemic occurred in a college in Strasburg and further epidemics broke out amongst the troops in France during 1847. In 1853 Chaten expressed the

view that goitre was essentially due to a deficiency of iodine in the air and water because it did not occur in areas where iodine was plentiful. Maumene (@rch. Gen. de Med. 1866) came to the conclusion that fluorine gave rise to goitre as it was plentiful in the soil of the Pyrenees where he had studied the disease. To test his view he fed a cat on fluoride of potassium for five months. Towards the end of that time the cat ran away, and on its recapture three years after the tumor was still present in its neck, which on dissection by Professor Gartell of Rheims was found to have no relation to goitre.

In 1874 Baillager showed that there were in France no less than 500,000 goitrous persons and 122,700 cretins and idiots. The disease was most rampant in mountainous regions in contrast to the plains where it was so scarce that it appeared to occur only sporadically. He further observed that goitre did not necessarily confine itself to these regions but had spread to parts where it was formerly unknown - e.g. the Ardennes. From his study of 52,849 cases he noticed that the proportion of women to men sufferers varied according to the severity of the endemic, being less marked when mild and more so when severe, but this did not apply to the plains. Goitre did not confine itself to any particular soil, but showed prevalence to the

dolomite and less to other parts. Seeking the cause in water he found by chemical analysis that there was nothing to show why this should be so. In 1867 St, Léger formed the opinion that goitre did not necessarily confine itself to mountainous regions as he found it equally common in the plains of Lombardy of the Danube and of Upper and Lower Austria. He concurred with Baillager that where the disease was slight it affected the women mainly. The cause, however, he maintained lay in potable waters containing the sulphide of iron in a form readily convertible into the sulphate. This supposition is absolutely necessary for his theory because the sulphate of iron is insoluble in water. To show the truth of his views he states that in Italy and France the drinking of waters from certain goitrous wells is resorted to so as to avoid military conscription. Furthermore in 1772 the crew of Captain Cook on running short of water collected ice, which was melted in iron vessels. Those who drank of it developed goitre, the rest escaped. MacNamara in 1880 described the occurrence of goitre in the plains of the Ganges. To it he attributed a malarius origin, seeing that it was associated with damp and marshy soils, and made its appearance during and after the rains. In 1881 Woakes put forward his vaso motor paresis theory. He believed that goitre was due to

paresis of the inferior thyroid artery as the result of disease or weakened function of the inferior cervical ganglions. The thyroid, he maintained acted as a ~~disturbance~~ diverticulum to the cerebral circulation in preventing any congestion of the latter. He showed that the vertebral artery took close origin to the inferior thyroid, both vessels deriving their motor nerve supply from the inferior ~~cerebral~~ cervical ganglion. A vaso-dilator wave originating from this ganglion would affect both of these vessels; consequently part of the increased blood supply would be received by the distensible thyroid instead of all of it going to the brain via the dilated vertebral artery. He denied that goitre was endemic and that it could be produced by potable waters. The immediate cause was reflex in nature owing to the existence of vaso motor paths between the neck and the genitals as seen by the voice in boys and the functional aphonia of girls at puberty. In 1838 Crawford and Inglis (Treatise on English Goitre) showed that the disease was hereditary by the following instance. French prisoners from a goitrous district were sent to a village in England and cohabited with the women of the place, with the result that the female offspring were goitrous. In 1875 Lawson Tait[21] in a paper on the enlargement of the thyroid body during pregnancy stated that in the majority of his cases intensive

haemorrhage was a prominent feature as the function of the thyroid was haematogenus. He further pointed out the close relationship of the disease to puberty and pregnancy explaining why it was commoner in females. The blood of females, he observed, has a larger number of white corpuscles and these during pregnancy become still more numerous indicating an exaggerated activity of the thyroid. Should the individual live in a goitrous district, she develops the disease as soon as the blood corpuscles from the action of the thyroid become exhausted. With the enlargement of the gland there is apparently a diminution in the formation of corpuscles - hence the anaemia. This function of the thyroid in the female explained why males escape more often. The blood of males contains more red cells and the system of the male is not called to undergo the strain that occurs in the females during pregnancy. Thursfield in a paper entitled the "Aetiology of Goitre in England" read before the Society of Medical Officers of Health in 1885 made the suggestion that goitre was due to diminished atmospheric pressure and was aggravated by the carrying of wights on the head. This view was exploded by Williams in the B.M,J. Oct. 24.1885 who pointed out that in a town in Bosnia every other resident suffered from goitre, whilst in a neighbouring village on the same level with the same habits there was no goitre. In 1894

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In 1894 Blake put forward the theory that the cause of endemic goitre was animal rather than vegetable as it follows water lines. In its action the organic poison resembled the nitrites in causing vaso-motor and vagal palsy. Kocher of Berne in 1883 detailed the results of the extirpation of the thyroid for goitre before the 12th Congress of German Surgeons. This was communicated to the London Clinical Society by Dr. Semon in Nov. 1883. He stated that in 34 patients in whom he had performed partial and complete thyroidectomy, sixteen with complete extirpation showed good results. In one a small accessory thyroid underwent hypertrophy. The remaining number showed more or less marked derangement of health, most marked in the oldest operated on cases and less so in the more recent. A few months after operation there appeared fatigue, weakness of the legs, feeling of coldness, decreased activity of mind and body. Swellings appeared in the infra ocular regions and the eyelids, the lips, nose and ears hypertrophied and the hair fell out. To this train of symptoms he gave the name "Cachexia Strumipriva". He, however, explained that these symptoms were due to an asphyxia set up by the softening and atrophy of the trachea. Sir Victor Horsley in his "Brown Lectures Jan. 3. 1880", gave an account of the results of his operations on monkeys for complete thyroidectomy. A few days after the operation there began tremors followed by fatigue, oligaemia, leucocytosis, mucin

appeared in the blood and in the subcutaneous tissues which became swollen, sticky and jellylike. A subnormal temperature followed by death in 5 - 6 days completed the picture. From this he concluded that the thyroid was partly glandular in excreting mucin, and partly haematogenous in function. Neither of these two observers were acquainted with the disease myxoedemia, and that all its symptoms and clinical features were part and parcel of that disease until it was pointed out by Ord and by Sir William Gull, who referred to it as the cretinous state of adult women. In 1883 Schiff showed that all the symptoms of "Cachexia Strumipriva" could be prevented by previously grafting thyroid tissue in the abdominal wall of the animal. This method was advocated independently by Sir Victor Horsley in the treatment of myxoedema, but owing to its absorption any ~~experiment~~ effect was temporary. At this point it is advantageous to consider the treatment advocated for goitre.*

* The medical treatment of goitre is as early as the history of goitre itself. The touch of the dead hand was a popular remedy and is mentioned by Pliny. It was thought that the goitre would disappear as soon as the dead body it touched had decomposed and decayed, more so the body of those who were killed by drowning or execution. A still more curious custom consisted in enclosing a small living animal such as a lizard or a toad in a sack and binding this upon the goitre when the animal was alllwed to die, and thus thought to carry off the disease in expiring. Very old and general is the belief in the influence of the different phases of the moon on goitre, and it is still customary in the Ems Valley for the goitrous to go out at night and gaze fixedly at the moon while holding the goitre in the right hand and repeating the following words "Was ich se nehme zu, Was ich fasse nehme ab."

The early Greeks treated the disease by the internal administration of burnt Sea Sponges, not knowing that it was rich in iodides. In 1821, Coindet[21] of Geneva introduced the iodine treatment as a sovereign remedy for goitre; although Straub of Hofwyl laid claim to the priority of its use. Sir Joseph Fayner on March 17th, 1884 before a meeting of the London Medical Society advocated a method of treatment promulgated by Aitken in India in the year 1855. The method in use was to rub in the Biniodide of Mercury for some minutes with an ivory speculum almost an hour before sunrise, the patient sitting with his goitre well exposed to the sun's rays as long as he could bear it. In the course of the day the ointment was again well rubbed in, and the patient sent home with instructions not to touch it. Woakes in the Lancet of March 1881 recommended the use of dilute Fluoric acid, basing his views on the "physiological relationships between drugs belonging to the same physiological groups". He preferred a ½ % solution of the redistilled commercial fluoric acid giving 30 drops to begin with and increasing to ℥ II T,I.D. In 1855 Cooling[22] of Dublin reported a case of 4 months goitre with dyspnoea and dysphagia which rapidly recovered with Gr,X of Quinine daily.

Turning now to the surgical treatment it is

interesting to note that before the advent of aseptic surgery, the thyroid was regarded with an amount of respect which discouraged operative treatment, and operations for goitre were prohibited in 1850 by the French Academy of Medicine. The 1st recorded operation is said to have been performed by Abdul Kassim [23] in the 10th century. With the advent of antiseptic surgery the whole thyroid was removed until it was shown by Kocher and Reverdin to be disadvantageous. Quadin of Naples in 1817 renewed the practice of introducing setons into goitres. These were passed right through the gland and left until suppuration occurred. Sir Duncan Gibb (Lancet, 1875, pp. 120) proposed division of the enlarged isthmus or excision of part of it or the whole, as by so doing the lateral lobes receded from the trachea, relieved the dysphagia, and yet still acted as splints in preventing collapse of that structure. Jones writing in the Lancet of August 30th, 1875 stated that he had excised the isthmus of six cases with complete success. In 1883 Kocher reported that he had performed partial thyroidectomy in 101 cases with 12.8 % of deaths, and McCormac in 1885 stated that the number of non malignant goitres operated on was 240 with 11.6 % of deaths. Counting cases of total excision only, the death rate varied little, being only 12.1 % .

From this he concluded that total was not more dangerous than partial excision. In 1896[24] Halsted showed that if a portion of the thyroid was removed the rest underwent hyperphasia which could be prevented if the remainder was saturated with iodine. The first practical application of the prevention of goitre by the administration of iodine followed the accidental discovery of saltness in iodine whereby sheep by feeding on it lost their goitres and prevented others from getting it.

Leaving the history of the treatment now, we resume the previous part of the history. In 1909 the Swiss Goitre Commission carried out extensive experiments on the artificial production of goitre in animals. Large numbers of dogs, rats, rabbits,

* The relation between goitre and water has been popularly accepted since the earliest times, Certain springs, wells and rivers were reported as goitrogenous and their water avoided for drinking purposes, as for example in Chers where an inscription was placed above a well warning the thirsty passer-by that the water rendered all those who drank of it dull. Likewise the Red well in Ethiopia, and the Gallus river in Phrygia were supposed to affect the mind. Ovid said "Sunt qui non corpora tantum verum etiam animos valeant mutare hominis. Vitruvius wrote of the people inhabiting the Maurienne Valley "Acquiculius in Italia et Alpibus, nationi medultorum et genus aquae quam qui bibunt efficiuntur turgidis gutturibus". Agricola in 1546 notes of a well "Cujus aquae potare adeo laedunt cerebrum ut stolidos faciunt."

guinea pigs and monkeys were employed. The water for the experiment was from the goitrous locality of Kupperswyl. Rats were given this water for 7½ months without avail. In 28 dogs experimented on 1 dog became goitrous, and in the case of the monkeys there was a slight increase in the size of the thyroid. No particular organism was blamed although they condluded that goitre producing water was essentially that in which nicro-organisms find their nutrient material for life and growth. A year previously E, Birch espressed the view that the nutrient materials were derived from the remains of ext~~ract~~ inct flora and fauna. In the same year he experimented extensively with apes, dogs and rats giving them the waterfrom the goitrous district of Rupperswyl, and in 1909 he repeated his observations at Aaran. He was of opinion that it was possible to infect rats with the disease after several months by giving them goitrous water to drink, but that on boiling the same it lost this property although filtration did not do so. Moreover, the addition of chemical substances such as peroxide of Hydrogen or Iodine rendered these waters harmless. Dialysis also removed the toxic substances from water, but the residue on the membrane of the dialyser still retained Goitre producing properties. A further observation was that water from goitrous localities derived from the soil an organism that imparted to it a toxic substance colloidal in nature which excites

the thyroid hyperphasia, the colloid producing goitre and the organism cretinism. Repin[27] in 1910-11 used the water of the goitrous district of St. Jean de Maurienne to experiment on rats, and found that the resultant hypertrophy was ten times the volume of the normal thyroid. Raising the temperature of the water to 70° rendered it harmless. To account for this he maintained that goitrous water had a high carbonic acid content by nature of which carbonates and sulphates of lime and magnesia are held in solution, such mineral waters being radio-active. This water he believes exercises powerful action on calcium metabolism over which the thyroid has control, and in order to cope with the excess of lime taken in, the gland has to hypertrophy to prevent calcification of the tissues. He dismisses the idea of micro-organism pollution as these waters are the purest known. A quarter of a century before him Meleland[28] had come to the conclusion that lime-stone rocks played a great part in the production of goitre. Drinking the water flowing over these rocks was the essential cause of the disease. Grange,[29] also from his extensive researches in the Alps came to the conclusion that goitre was chiefly prevalent on the calcium and magnesium limestone formations, less so in the coal measures and absent in the granite formations. He was, however, of opinion that

magnesium was the metal to blame. More recently James Berry in England found that goitre was rather common on the calcareous rocks but not exclusively.so. From these investigations an impression is derived that the causal factor of goitre is metallic rather than organismal in nature, but there is however stronger proof in favour of the latter proposition from what follows. In 1909 Marine [31] and Lerhart conducted experiments on a large fish hatchery in the mountains of Pensylvania to investigate the relationship of the so called thyroid carcinoma of brook trout to simple goitre, as it was threatening to ruin the fish industry. there. A series of tanks were arranged in houses along the course of the brook. The water was derived from a single spring supplying the upper six houses, whilst the lower five received water that had passed through the upper six together with that from a second spring and a pipe line ¼ mile away. The houses are arranged in a series of six upper and five lower, and between these the water follows the original brrok for ¼ mile. The first four houses contain 8/12 months fish, houses V-VIII 1 yr. fish and IX and X 2 yrs. fish. Pollution occurs at houses VI and VII, i.e. between the last house of the upper series and the first house of the lower. As the result of an examination of fish taken indiscriminately from the houses and from a neighbouring trout stream, they

concluded that fish not confined to tanks are goitre free. Beginning with the series of tanks the fish even in the uppermost series were markedly affected with a gradual increase until the brook is again reached. Commencing with the lower series there is a marked improvement as the result of the increased water supply and its peregrination along the original bed of the brook. Furthermore, they state that overcrowding, overfeeding, and limited water supply leads to filthy, unhygienic and insanitary surroundings which was associated with goitre in some unknown way. Gayland[32] in 1910 from an examination of fish arranged in tanks one above the other and having the same water supply also showed the marked increase of goitre from the highest to the lowest tank. Marine and Lenhart opinioned that the thyroid hyperphasia was the result of a nutritional and ~~vegetabi~~ metabolic ic disturbance, but Macconson has drawn attention to the way in which fish nose about the sides and corners of tanks, and it is here that the excitant of goitre is most abundant.

Any history of goitre must necessarily be incomplete without reference to the work of Macconson in the Himalyas of India. He found that 20% of the population was goitrous; the popular belief of its origin being attributed to deficiency of food, to eating mulberries and the drinking of snow water contaminated with fine sediment. The water supply of the district although much contaminated showed on chemical

chemical examination little sign of organic impurities. Goitre increases from the highest to the lowest village along its banks. In 1903 he gave five dogs the natural water from this region, and five others the water previously boiled. Of the former series one developed goitre, of the latter none. In 1904 he gave five puppies the natural water, five others the same water boiled and still another five the residue, and a last group of five the filtered water. Those that drank the boiled filtered water escaped the disease. In the same year he showed that neither boiling nor filtering prevented the disease so long as infection from the soil took place by the following experiment. He selected a number of goitrous and non-goitrous individuals to whom he gave boiled and filtered water for two months. No restrictions were put on the men from infection from the soil, those who were goitrous became worse whilst the rest developed the disease. This observation had, however, been pointed out in 1848 by McKenzie of Lanarkshire when he showed that goitre was common enough amongst the miners and those who handled the soil, whilst in other occupations it was unknown. Baillanger has further proved that vegetables grown in a goitrous locality may spread the disease. It is therefore not out of place here to credit the soil as one of the media for the conveyance of goitre. In 1905 he assumed that the intestinal tract was the seat of the disease, and

further

further strengthened this belief by the effects of intestinal antiseptics commencing with Salol and continuing with thymol with perfectly good results. Equally good results were obtained with vaccines from the stools of goitrous patients. A year later he showed that the residue separated from the candle of a Berkefeld filter was capable of conveying the disease to mankind by taking the residue himself and other men in the village. From his observations he is of opinion that goitre can be produced in men in a few weeks time by the residue of goitrous water but not if this was boiled previously. The excitant of the disease is essentially organismal rather than chemical in nature, that it is most abundant in the sides and bottoms of water channels where its nutrient material is most abundant. With the object of conveying the disease from man to animals he selected non pregnant female goats to which he gave the water passed through earth contaminated with faeces from goitrous individuals. The results justified the opinion that the disease was transmissible to these animals. Other experiments with cultures from goitrous stools were positive in a similar way. From this account of the history of goitre the disease has been traced from the earliest times when the causal factor was merely guessed at through the period when experiments

appeared to establish its nature as chemical. More recent observations have proved that none of these theories were conclusive, and concensus of opinion has gradually verged over to the side of the micro-organismal theory. Not only that but its origin has also been proved.

PATHOLOGY OF ENDEMIC GOITRE.

Excluding Inflammations the histological evidences of the thyroid gland's departure from the normal are in all cases the same in their beginnings. Just to refresh the memory let me refer briefly to the normal in the first instance. The thyroid gland forms a smooth uniform gland with two lobes connected by an isthmus. The anterior surface is uniformly lobulated throughout and contains a colloidal substance with an Iodine Content of 3 mgm. per gram of dried ~~thymol~~ gland, the weight of the average thyroid being 25 gms. (1). Histologically the thyroid is made up of vesicles of fairly uniform size and shape lined by a single layer of cubical epithelium and containing a uniformly staining colloid material. Separating the gland into its various lobules are fibrous tissue septa which form the stroma of the gland. In the newly born the thyroid gland is characterised by an absence of colloid material, by an abundant desquamation of the epithelial cells and by a considerable development of blood channels, but a few weeks later it assumes its classical oarius structure. Goitre in children up to 12 years of age is generally diffuse and characterised by an increase in the number of vesicles with a decrease in their volume as the result of

excessive proliferation of the epithelial cells. Under influences which cause thyroid enlargement in man irrespective of their nature, the gland undergoes certain changes depending on the intensity, virulence, dosage and continuity of action of the exciting agent at work. In all cases a state of active secretion is initiated which gradually merges into one of abnormally active secretion. The point of departure from the normal is difficult to determine but there are certain signs to indicate it with more or less distinctness:- (1) an increase in the height of the vesicular epithelium beyond the low columnar type, (2) an increase in the number of the vesicular and parenchymatous cells and (3) the formation of new vesicles. The first stage in the process of departure from the normal is therefore an aggravation of the normal process of active secretion. There is in the first place a markedly increased blood supply to the gland as seen by the dilated state of the capillaries and larger vessels of the stroma, and in addition an increased secretion of colloid more fluid and thinner than usual. The next step in the process is an increase in the size of the cells lining the vesicles which vary from cubical to high columnar according to the severity of the hyperplasia. Should these changes occur rapidly the cellular lining of the vesicles may undergo folding or plication, the cells becoming so high as to fill

the whole of the vesicle. At this stage the gland may not have increased in size and there is little or no colloid in the vesicles. Following the glandular hyperplasia a desquamation of the epithelium lining the vesicles occurs , which coagulates and by irritation cause further proliferation and secretion by the epithelium. The increased secretion is retained in the vesicles and as a result of pressure the vesicles lose their rounded outline, becoming irregular in shape instead. The walls may rupture and give rise to cyst formation. Coincident with the parenchymous hyperplasia proliferation takes place in the connective tissue stroma which may be localised or diffuse in its distribution. The whole process taking place in the parenchyma is essentially catarrhal and in a sense compensatory in character resulting in the formation of an increased amount of colloid which is to a large extent retained in the gland. Why this retention should occur is a subject of much controversy. Normally the colloid finds its way out of the alveoli by minute channels into the intralveolar lymph spaces, and thence via the lymph vessels into the blood. It has been suggested that an obstruction occurs in this lymphatic system by a parasitic organism causing a damming back of the secretion into the alveoli. On the other hand there may occur a change in the colloid itself which

renders it more difficult to escape. As the colloid pressure increases in the alveoli they, by pressing against each other and the rest of the gland nechanically obliterate the interalveolar lymph spaces and so prevent any escape of colloid secretion. Now, there are authorities who believe that the thyroid gland exerts its antitoxic properties on the blood as it passes through the gland. According to this view then the increased retention of the colloid in the gland would be in consequence of an increased toxicity of the blood passing through it. As regards this view the general consensus of opinions favours the idea that the thyroid exerts its antitoxic power, not in the gland itself but by pouring its secretion into the blood i.e. intravascularly rather than intrathyroidically. This view then becomes untenable. As the goitre develops a further stage there now results an increase in the size of the gland, its vascularity increases still further and it becomes softer in consistence. The vesicles become larger and the epithelial cells increase in size. Should the exciting factor still continue to operate these changes become more marked, and to them are added an increase in the height and the number of the cells lining the vesicle - the cells becoming high columnar in type with desquamation and papillary formations. A striking feature of the cells at this stage is their variation in size, shape and staining power of the nuclei.

Some are enlarged others small irregular kidney or pyriform in shape. Cellular increase gives rise to an increased thickness of the ~~vesi~~l walls to outgrowths of the epithelial lining forming knots and plications. Thus the vesicles come to be more irregular in shape, the high columnar epithelium lining encroaching on the acinar contents which become relatively smaller: pari passu with this multiplication and new vesicle formation a greater or less increase in the fibrous stroma occurs as well. The whole organ may be involved or different parts of the gland may be affected in different degrees. The hyperplastic process may take one of two courses,(a) a reversion to the colloid state forming the so-called "colloid goitre", or (b) it continues without a period of rest, terminating ultimately in cell exhaustion and cell death. The first results from the causal factor ceasing to operate at this stage of the gland's transformation, the gland undergoing a process of involution, which when complete a colloid goitre results. In this process of reversion to the normal the gland becomes smaller but still remains enlarged to some extent, either the whole or part of it. The vascularity decreases, the old and the new vesicles become distended with colloid, absorption of a number of new formed elements occurs, and iodine is again stored in the colloid. The mode of the formation of a

colloid goitre has already been discussed in an earlier part of this section. The increase in the colloid does not involve all the vesicles to the same extent, in some it is so marked as to be visible to the naked eye, whereas in others it can scarcely be detected. Vasculation may be present as well as loss of staining power. Where the thyroid has gone through the process for the first time it is said to retain the same physiological and biological capabilities as the normal gland in the way it responds to an excess or deficiency in iodine. Evidences of its previous enlargement are, however, shown by (a) an increase in the size to a greater or less extent, (b) a thicker capsule, (c) vesicles irregular in shape and size with proliferation of the epithelium into the acini, (d) a more plentiful stroma. The process of reversion to the colloid state represents the second stage of the production of simple goitre. Its onset is determined by the fact that goitrigenous influences are intermittent in their action. If a further attack of hyperplasia occurs in a colloid goitre the whole process is repeated; the gland between the repeated attacks returning to the colloid state. In this state there are said to occur metastases by the vascular or the lymphatic route to the cervical mediastinal and bronchial lymph glands, but the seat of predilection of these metastases is the long bones, the sternum and the spinal column.

Histologically such metastases do not differ from simple goitre. Here too are follicles of different forms, round, oval or elongated with ~~cuboidal~~ cubical or cylindrical epithelium. The colloid is as abundant as in the simple goitre, the capsule is intact, the only suspicious thing about it is its metastatic character. Should the hyperplastic process continue without a period of rest ultimate exhaustion of the cells occurs. They become vasculated, irregular in shape and size, and desquamated into the acini. Fibro blasts take the place of the dead parenchyma, the fibrous stroma of the gland becomes greatly increased - the glands powers of recovery are at an end. Throughout the process of hyperplasia, in whatever way induced, certain chemical changes occur in the gland. The iodine disappears and its disappearance is proportionate to the degree and duration of the hyperplasia. The process of thyroid hyperplasia is therefore in some measure a compensatory one due to the failure of iodine assimilation. There may develop in the gland rounded or circumscribed masses apart from the main body of the goitre - the so-called single adenoma which may occur either singly or several nodules scattered throughout the gland which encroach on the parenchyma, causing pressure atrophy. This ~~oedematous~~ adenomatous degeneration is one to which all parenchymatous goitres sooner or later succumb. Furthermore in all chronic goitres considerable atrophy of the parenchma occurs, causing a diminution

in the functional activity of the gland. The degenerative changes that occur in a goitre are most numerous in cases where the gland has gone through the above mentioned processes a number of times, and the first to be considered is cystic degeneration. Cysts are classified as primary or true, and secondary or false, and may arise in any of the following ways:- (a) by distention of one or more of the vesicles by an accumulation of colloid, the intervening walls of contiguous cysts becoming absorbed, small cysts becoming fused to form larger ones. Another much commoner mode of production is from adenomata already existing in the gland. The interior of the softer forms of adenoma frequently breaks down and liquifies, until the capsule of the adenoma forms the wall of the cyst. Still another mode of cystic formation is from haemorrhage into the gland. The soft nature of the gland when parenchymatous goitre exists readily permits accumulation of blood into it which may be extravasated either as the result of slight injury or the spontaneous rupture of a small vessel. A remarkable peculiarity of thyroid cysts is the unusual tendency to intracystic haemorrhage which may so increase the size of the gland as to cause dangerous asphyxia. The discovery of blood in a cyst of the thyroid does not necessarily indicate malignancy, as it is a common experience to find that having tapped a cyst previously the contents become haemorrhagic.

On the other hand malignant disease may produce cysts containing clear fluid. Primary cysts are said to be found chiefly in the isthmus and the lower poles whereas secondary cysts may occur anywhere in the gland. The structure of a cyst may be considered under two headings:- (a) the structure of the cyst wall, (b) the structure of the contents. In small recently formed cysts the wall has the same structure as that of normal vesicle consisting of an exceedingly thin and delicate layer of connective tissue, lined by a single layer of epithelial cells. In larger cysts it is more fibrous and tough, being composed mainly of fibrous tissue closely packed together. The simplest cysts contain the ordinary yellowish, slightly viscid colloid material secreted by the lining membrane. When the cysts are large the contents become considerably altered. The fluid may be clear and watery and more commonly contains blood, or the altered contents become more viscid and then present the appearance of stiff jelly. Sometimes calcification may be so extensive in a cyst as to convert it into a calcareous mass. Growing into the cyst there may be papilliferous processes which like those of the breast show a degree of malignancy in that they tend to recur after removal. As regards cysts they are degenerative changes and not pathological entities by themselves. As the colloid goitre becomes older the connective tissue becomes

markedly increased, whole areas becoming fibrous. (Vide Fig. 13). The epithelium may disappear by desquamation into the colloid which ultimately becomes replaced by fibrous tissue. Whether the fibrosis is the result of, or the cause of, the disappearance of the colloid is a much vexed question. Should the fibrotic change be extensive myxoedema may result, irrespective of the presence of an enlarged thyroid. In very old standing cases calcareous deposits occur in and around certain areas forming either a shell of some part of the gland or calcareous septa may intersect the gland. These calcareous deposits not infrequently become attached to the trachea causing the so-called tracheo-malacia - a forerunner of collapse of the trachea. In any fibrotic areas malignant degeneration may take place, in which case the cells are larger, stain more deeply, and form solid masses, or the aciniform solid cell columnars. This is not however the typical malignant change in the thyroid which manifests itself rather by active acinal proliferation. Another change may take place in a goitre not affecting the secretions but now the cell elements, producing an adenoma of which there are two main varieties depending on whether the mode of hypertrophy has been diffuse or localised. Under the former is included the diffuse adenomatous, and under the latter the so-called foetal adenoma. As regards the former its origin and nature is difficult to

explain, but there is a general concensus of opinion in favour of regarding it as a type, distinct from the so-called foetal adenoma. 6 If it owes its development to embryonic cells at a later period then it merely represents a further degree of differentiation of the latter. On the other hand it is possible for the change to take place in adult tissue which has been the seat of a long standing goitre. It occurs most commonly near the lower poles of the thyroid, and in the region of the trachea, and may be recognised by the occurence of multiple closely packed nodules of differentiated tissue with a thick capsule which do not attain the size of the foetal type. The glandular prolification in this case takes place in two more or less definite directions:- (a) where the multiplication of the acini or from a toxic adenoma and (b) where the epithelial elements form papillary projections into the interior of the vesicles. They vary greatly in size but the degree of enlargement bears little relation to the severity of the symptoms 7 they produce. When small they are firm and elastic whilst the larger variety are soft and ~~pressable~~ Pulsatile. On section they are red in colour at first but greyish later, as the result of the degeneration of the interstitial cells and the colloid. Microscopically the chief change in the acinal variety is in the cells lining the acini. These become bigger, show evidences of hyperactivity

by the invasion of the interstitial tissues and by acinal formation. In the papillary type (Vide Figs. 3 and 4) there is prolification of the cells of the pre-existing acini producing papillary projections into the lumen of the vesicles. In long standing cases degenerative processes occur whereby the cells desquamate into the lumen of the acini. The so-called foetal adenoma arises from the Wolfer's rests which have been left out during the development of the thyroid. They form a completely encapsulated tumor ovoid in shape and easily separated from the surrounding tissue[9]. On section this adenoma is deep red in colour, and in rapidly growing type colloidal areas may be detected, whilst in the old cases haemorrhagic cysts are common. Its structure is that of an adenoma, being made up of closely packed acini lined by a single layer of cubical epithelium and contains little or no colloid. Wolfer's rests are usually described as being present in one or both lobes of the thyroid, either as single or multiple small clumps of embryonic cells. In the early stage they have no capsule, are not arranged in follicles and contain no colloid or iodine. They may remain in this state or in the process of growth become differentiated, forming well defined follicles resembling the normal thyroid very closely.[10] This type of adenoma owing to the primitive nature of its cell elements commonly becomes malignant.

Next we come to consider the various kinds of

malignant disease, and of this there are ~~six~~ varieties which deviate from the ordinary type in that they occupy a position intermediate between the innocent goitre and the typical carcinomata. Such are the malignant adenomata and the papilliferous cystic tumours. In general appearance they resemble the simple adenomata but differ in their tendency to recur after removal and to disseminate. The papilliferous cystic tumours grow slowly and exhibit a low degree of malignancy. The so-called malignant adenoma appears in the form of the solid mass, well encapsulated and presenting a nodular or lobulated surface, the lobules showing a soft periphery and a firm central area.(Vide Fig. 6.) Their red colour indicates an abundant blood supply and a haermorrhagic tendency. On section the tumour may yield a mucous exudate and colloid portions resembling the normal thyroid may be present. The appearance of this tumour is preceded by a period of slow enlargement of the gland which may extend over several years. The rate of growth of these malignant adenomata is

not rapid, two to three years elapsing before pressure symptoms appear, metastases being less common than in carcinomata. The structure is much the same in the various lobules which present a peripheral cellular zone of small alveoli without definite lumena or cellular cords of secondary alveoli, and a central zone in which alveoli are more adult and may contain

colloid. There is much variation in the size of the cells, the alveoli and the ~~pressure~~ Presence of colloid, but there are usually signs of a tendency towards alveolar formation. The cells are atypical and strongly indicate the tendency towards neoplasm. (Vide Fig. 10.) . The stroma is abundant and vascular. A sub-group of this type is the papillary epithelial tumours, yet some are relatively simple and benign, while others are malignant. They arise as single or multiple or nodular tumours which may fuse to form a single mass. They are soft in the early stages but later become firmer as the result of fibrotic changes. These tumours are also ~~preded~~ preceded by a chronic enlargement of the thyroid, and growth is usually slow, the state of malignancy varying according to the type of cell present. Their structure presents a complete network of vascular stroma enclosing alveoli and small cystic cavities into which project many papilliferous projections. The papillae are composed of epithelial buds, and the cells are cubical. As has been pointed out the separation between the adeno-carcinomata and the carcinomata of the thyroid is very imperfect, many transitional types occurring where it is difficult to include them in either group. On the whole it is possible to distinguish two types of malignant disease of the thyroid roughly, one arising from the epithelium and the other from the connective tissue, and accordingly we have

carcinomata and sarcomata. An outstanding feature of malignancy of the thyroid is the great tendency of metastastisis either by the blood or lymphatic route or by both. The disease is essentially one of advanced age and does not show much difference in the selection of the sexes. It may occur in a gland that has previously been the seat of an enlargement or not. Instead of being hard the tumour may present itself in the form of a soft swelling which may easily be mistaken for a cyst, or when occurring in young subjects and diffuse in character simulate parenchymatous goitre. In the average case carcinoma forms a hard lobular tumour firmly adherent to the surroundings, the ~~anterior~~ cut surface of which is greyish white in colour with a tendency to undergo softening of its constituent parts. Histologically (Vide Figs. 8 and 9), the growth shows the alveolar type with large or small groups of atypical cells and a nearly constant absence[13] of colloid. The histogenesis of thyroid carcinoma like other growths of the gland is under dispute. Wolfe[14] and Langhans assume that all ordinary epithelial tumours arise from cell groups which remain in the embyronic state through disorders of development and later commence to grow. On the other hand Virchow[15] believes that carcinomata arise from adult tissue. There is however little doubt that there are tumours of the thyroid which may conveniently be grouped under each of these

headings. Regarding sarcoma the general aetiology is the same as that of carcinomas. Sarcoma occurs much early than carcinoma and has a very rapid course. The tumour is either circumscribed or more commonly diffuse, invades lymph nodes and veins causing metastastises by both the blood and the lymphatic system. It develops in preference from nodular goitre 16 owing to the presence of connective tissue of a type which is abnormally developed and readily undergoes neoplastic changes.

AETIOLOGY AND DISTRIBUTION

Goitre is very widely distributed geographically, infact it may be said to be a universal disease. Entire districts are often so severely affected that the majority of its residents both human and animal are a prey to the disease; but the limitations of such areas are often so sharply defined that one village may be free whilst an immediate neighbour is ripe with the disease. Further proof of the localised nature of the disease is seen by the numerous examples of individuals from goitre free districts who rapidly acquire the disease while living in regions where goitre is endemic and who recover on leaving the district before permanent changes have resulted. The disease is so common in certain parts of England and Scotland as to be distinguished by such names as Derbyshire neck and Nithsdale neck. In the map there is shown in colour those parts where goitre is known to prevail and also the extensive distribution of the disease. Two very striking facts emerge from its distribution, the first being the very marked association of the disease with mountainous regions, and secondly the comparative limitation to temperate and sub-tropical zones. It is not, however, entirely limited to these as it occurs in regions of great cold such as Siberia and the Hudson Bay territory of North America, and also in regions of great heat as

in tropical South America, India and Ceylon. Whilst, therefore, temperate and sub-tropical climates favour its occurence, neither great heat nor cold excludes the disease. In Europe the centre of the highest endemicity for goitre is the Alps whence it radiates in various directions, numerous other foci occurring in connection with different ranges and deep lying river valleys such as the Carpathians and Pyrenees. In France it is found mostly in the Savoy, in Germany chiefly in the Black Forest, in Switzerland it is worst in the Valais, in Austria especially in Styria, in North Italy about the Alps, and in Russia mostly about the Altai mountains. In Asia it occurs in some of the western parts of Siberia, in Western China, in Bengal especially about the Himalayan mountains, in Calcutta and in the villages of lower Bengal[1]. In africa it occurs in Barbary and in the mountains of the western bank of Lake Tanganyika and in some districts of central Africa. In North America it prevails in Virginia, Pennsylvania, New York and along the course of the Saskatchewan mountains and in the region of the Great Lakes. In South America the disease occurs along the upper and lower course of the river Magdalen. Goitre also prevails largely at the base of the South American Andes and in most South American countries. In Scotland goitre is found in Perthshire, in Roxburgh, the upper part of Peebles, in

Lanarkshire (McKenzie), in Dumfrieshire and to a small extent in the Midlothians. With regard to England and Wales the geographical and geological distribution may be taken together. Commencing with the tertiary rocks(pliocene miocene and eocene) of England they occur in two areas forming the London and Hampshire basins. Taking the former, the disease occurs sparingly in some of the villages near Aldershot and in London itself. In the Hampshire basin it occurs near Romsey but not in the neighbourhood of Bournemouth. On the extensive region of chalk goitre occurs to a considerable extent. It occurs in Bedfordshire, in north Essex and on the borders of Suffolk. In the villages situated upon the chalk of the North Downs there is little goitre and the same applies to the South Downs[2]. Coming now to the layer which underlies the chalk, that is the upper greensand which comes to the surface as a comparatively narrow band extending from Yorkshire to Devonshire, and also skirting Kent, Surrey and Essex goitre is present in scattered cases. On the other hand it is endemic on the lower greensand area of the Weald and in the villages Haslemere and Horsham on the Weald clay. Underlying the greensand is the oolites (granular limestone) but goitre is not very common in this series except near Helmesley in Yorkshire and at Chiselburgh in Somersetshire which has long been noted as a haunt for the disease. The next formation

is the Lias (Blue limestone rock rich in fossils), and on the upper members of this series which lie immediately under the Oolites, goitre is rare except in the south of Northamptonshire and the labouring parts of Warwickshire. Upon the Trassic devision of the new red sandstone goitre is endemic. The lower devision of the new red sandstone is the permian, (red sandstone and limestone) also called the magnesium limestone because a large proportion of its rocks are composed of that material. It occurs as a narrow band extending from Northumberland to Nottinghamshire, and in this series goitre is endemic, especially in Yorkshire. The next series is the caboniferous limestone strata which runs along each side of the Pennine Range through the west of Northumberland through the Weardale district of Durham, the west of Yorkshire, Derbyshire and into Cumberland and on this geological formation goitre is endemic in the highest degree. (Lebour). As regards the Devonian or old red sandstone; the Silurian (a series of rocks forming the lowest division of the palaeozoic series) Cambrian (palaeozoic rocks lying below the Silurian in Wales and Cumberland) and the eruptive series goitre is absent. From the foregoing it appears that while goitre is markedly prevalent in the limestone strata it is not confined to them. Further this series is the most extensively distributed and inhabited strata in

in England; as also the most porous, the most fertile and with a high organic content. As the chief hardening ingredients of water derived from these rocks are the bi-carbonates and sulphates of lime it is not unnatural that these salts should have been considered the cause of goitre. On the other hand numerous water analyses have failed to prove their presence. St. Lager in his treatise "Sur les causes du crétinisme et du goitre endemique" enumerates about forty theories advanced by authorities as the cause of goitre, which in itself proves the extent of the controversy. Each and every condition of the air has been brought forward as the cause of goitre, hot, cold, damp, stagnant, too little or too much oxygen and a paucity of sunlight. That air does not carry the goitrigenous factor is evident from the almost universal distribution of goitre. It occurs on high mountains, low valleys, on plains, in moist and marshy districts, in dry and well-drained localities, by the sea-shore as well as inland, by lakes, rivers, in hot as well as regions of perpetual snow. Further it has been asserted that goitre is not so prevalent on the most exposed parts of mountains but rather upon the slopes and valleys of high mountains which are little exposed to sunshine and where the air readily becomes stagnant. Lack of sunshine and fresh air would then seemingly account for the disease were

it not for the fact that the disease occurs also on plains and deserts well exposed to sunshine and fresh air as in the plains of Lombardy, the Danube and the Sahara Desert. On the other hand the disease is absent from similar valleys as in Norway and the highlands of Scotland. Nor is the disease more prevalent in those who work under conditions devoid of proper sunshine and fresh air. Social and economic conditions have been considered the cause amongst French and Italian writers but evidence seems to have established definitely that whilst overcrowding is a factor in so far as it involves a reduction in the amount of certain food constituents available for each individual in the crowd, or an augmentation of the unhygienic conditions of life under which overcrowding gives rise to yet overcrowding, per se is of small importance as a cause of goitre in man; for the malady may be as common in overcrowded areas as amongst those under favourable circumstances, and whilst labouring classes are poorer than other classes of the community and their food deficient in nourishment it cannot be regarded as the cause but rather as a predisposing factor. An ancient theory believes the aetiological influence lies in the habit of carrying weights on the head, and whilst this custom is confined to narrow territorial regions whereas goitre has a world wide distribution, the disease may also develop in animals and those who have never carried anything

heavier on their heads than a hat. This view then is of historical interest only. The association of goitre with mountainous regions is one of its striking features, and whereas the Alps, The Pyrenees, the Himalayas, and the Pennine Range in England are the noted haunts of the disease it is not confined to them. The disease also occurs on the plains of Lombardy and the St, Lawrence of Canada whereas certain mountainous countries are almost exempt, as in the highlands of Scotland, for instance. This is explained by Mclean from the fact that such mountains are not perpetually snow-capped. In perpetually snow-capped mountains the endemic is high as the water from such places is practically pure distilled water and prone to be devoid of iodine[4]. While then the hilly nature of the country cannot be regarded as a necessary factor for the development of goitre there is a strong belief that its preference for mountainous regions may to some extent be dependent on the increased functional activity of the ~~thyma~~ thyroid at these levels owing to the lack of oxygen. Now while this tends to cause the ~~thyma~~ thyroid to empty itself of colloid and to throw the gland into a state of increased secretory activity seeing that the glands function is to regulate the respiratory exchanges the process, if sufficiently long continued, causes the initial activity to be replaced by inactivity. On the other hand the unprotected water supply of

mountainous regions together with the composition of the soil which favours its pollution by superficial drainage are important factors favouring the development of goitre amongst the residents of such localities. The frequent association of goitre with rivers, lakes and irrigated or marshy tracts is another feature of its distribution. Now while limestone and lime bearing rocks are those most commonly associated with goitre, the disease can prevail on soils of any geological formation. The suitability of the soil does not depend on its chemical composition and geological structure but rather of its organic contents. The frequent association of goitre with limestone rocks is to explained by their great porosity and wide geographical distributions. They are also amongst the most freely cultivated and inhabited strata, owing to their fertility, and their porosity favours the retention of organic matter animal or vegetable; the presence of which may convert any soil into a suitable habitat for the causal factor of the disease. The water derived from such strata while laden with an excess of lime would in addition be impregnated with the exciting agent. Whilst it seems as an established fact that the goitre causative factor is frequently conveyed to human beings by potable waters there is no uniformity in the opinionsiof the nature of the exciting agent. Galen, Hippocrates and Pliny believed snow waters contained the goitrigenous principle in

virtue of their coldness. Moreover, most of the epidemics of goitre may be accounted for by the agency of water e.g. the epidemic that occurred amongst Captains Cook's crew only affected those who drank a certain water, the others who made use of the original supply were not attacked. In Italy and France, according to St, Lager, the drinking of certain waters is resorted to with success to escape military service. The most convincing proof in support of the water theory is furnished by newcomers who partake of a goitrigenous water and develop goitre which disappears after ceasing the practice. Many Instances are on record where the boiling of the drinking water sufficed to prevent the disease in endemic territory or where rain water was a sufficient safeguard. Further proof lies in the fact that in cases where the population who were goitre free whilst using river water developed goitre on drinking the water from wells and where the changing or protection of a water supply has caused a decline or a disappearance of the disease. Any water may become goitrigenous in picking up the exciting agent from soil which contains it: the limestone strata by virtue of their porosity and their high organic content furnish the most ideal conditions for any water derived from them to be so infected. It is in mountainous districts where limestone abounds that these conditions are most frequently found in combination - hence goitre is a disease of

hills. Granted that water is a vehicle for the goitrigenous principle there still remains the question as to what constituent causes the water to acquire these harmful properties. Whilst chemical analysis has failed to discover anything of importance many theories have been put forward to explain this, and while true of one part of the world it is not substantiated when applied to a wider field. Grange attributed to the presence in water of magnesium salts the goitrigenous properties, but abandoned this view as the result of more extensive geological researches. St. Lager assumed that goitre was due to the presence in potable waters of iron in the form of the sulphide readily convertible into the sulphate, a supposition absolutely necessary for his view, as the sulphide is insoluble in water. The iron pyrites theory is open to the objection that the disease is not limited to iron bearing rocks, nor is it always found on such rocks. Some of the most highly goitrous localities in the world are those where the soil is practically free from iron, while in many localities such as the Iron mining districts of France the disease is practically absent[5]. Nor is this view supported by experiment. Goitre is not observed to result from the administration of the salts of iron over prolonged periods to anaemic girls. Since no sufficient cause could be found in the metallic and chemical constituents of water it was thought that

its harmful effects might be due to a deficiency or absence of some necessary element such as carbonic acid, absorbed air or iodine. Of these the deficiency or absence of iodine is the most important, as it is the chief cause of the hyperplasia of the glandular elements, the reaction beginning when the iodine content in the gland falls below one per cent. Now whilst this shows that the immediate cause of the hyperplasia is a deficiency of iodine the ultimate cause is a different matter. If the deficiency in the iodine content of potable waters were the only cause then it should naturally follow that all those partaking of such a water would become goitrous sooner or later. On the other hand the very reverse is true. Rarely does goitre affect all those residing in a goitrous district, but rather selects groups or separate individuals apparently at random. Nor can the iodine deficiency theory account for the greater prevalence of goitre in women [6]. Furthermore water analysis has proved that goitrigenous and non-goitrigenous waters frequently contain the same amount of iodine. From the earliest days of search for the cause of goitre many investigators have sought to establish a correlation between certain geological formations and endemic goitre from the fact that the quality of the water must necessarily be influenced by the character of the soil from which

it springs. Billiet (Sur les goitres et le cretinisme) was amongst the first to investigate and lay stress on the distribution of goitre on geological lines. He found that goitre was prevalent in the argillaceous calcareous schists, it was absent from the Jurassic and Neocomian earths of the Savoy, On the other hand McClelland found that goitre was absent from the first named strata but bore a close connection with the limestone rocks. The cause of goitre according to his view was the presence of lime in potable waters. Now excess of lime does not cause thyroid hyperplasia but causes an accumulation of colloid in the vesicles of the thyroid by increasing the viscosity, thus favouring its accumulations. Grange from his researches in the Alps concluded that goitre occurred chiefly on the limestone and magnesium limestone, and that magnesium in the water was responsible for its goitrigenous properties. St, Lager attributed to the metalliferous rocks especially those containing iron the cause of the thyroid enlargement, as water derived from such wells must necessarily be impregnated with that metal. Now whilst these views may be true of a particular region in which the disease was under observation there is abundant proof that goitre does not necessarily limit itself to any particular geological formation. As a matter of fact if all the geological formations on which it is known to

occur were put together there would be very few, if any, from which the disease is absent. As a general proposition Repin[7] ~~Papini~~ affirms that goitre is never absent from a mountainous range of any importance, and according to its height and precipitateness the endemic is more intense. The disease attains its maximum not on the upper zone but on the mountain slopes and adjacent valleys and plains. He attributes capital importance to the chemical ingredients of goitrigenous waters, especially the salts of lime and magnesium in combination with radio-active substances, and as the function of the thyroid is to regulate calcium metabolism the presence of an increased intake of these salts causes it to augment it secretion to prevent ~~higher~~ calcification of the tissues, and it does so by hyperplasia. As a matter of fact this is a grave error in the assumption underlying his theory as the parathyroids and not the thyroid control calcium metabolism. As regards the radio-activity of waters as a causal factor In Saxony there are other regions rich in radio-active substances where goitre does not occur. It may therefore be concluded that there is no causal connection between the two, and if there does exist an endemism in such regions the occurrence is purely accidental and coincidental. Having failed to interpret the exciting agent of goitre in terms of certain geological formations or substances in water, observation

has been diverted in a different direction. Wilms is of opinion that goitre is due to an organic ferment as it is impossible for a living organism to be confined to certain geological formations. He affirms that during the formation of the marine sedimentary strata sea fauna must of necessity have been included in these deposits which therefore would be highly impregnated with organic substances. Water running through such strata would carry in solution some of the products of decomposition of these organic substances which would act as the excitant of goitre. Further proof thereof lies in the fact that water passed through a Berkefeld filter is still capable of producing the disease, whereas if raised to a temperature of 70 °C, it loses its harmful effects as this is the temperature at which ~~germs~~ ferments are rendered harmless. From these facts he is of opinion that the exciting agent is probably colloidal in nature. Sasaki[9] acting on this suggestion fed animals on decayed meat and fish and gave subcutaneous injections of large quantities of cadaverous products but the results were entirely negative. These findings are of importance in showing that organic ferments are not capable of causing goitre. On the other hand the water aetiology of goitre is denied by Kutchera[10] who maintains that the only reasonable interpretation of the endemic lies in the contagion by contact for these or

other diseases like typhoid and cholera which for a long time have been considered to be water borne only, have now been shown to be transmissible by other means of which the most important is contact. Furthermore goitre is not necessarily confined to any particular region, this assumption having arisen erroneously owing to the fact that goitre is so chronic in nature as to last a lifetime, its fluctuations covering decades and centuries rather than weeks and months. An even more significant fact is that goitre is not evenly distributed amongst inhabitants in a goitre locality as would be the case had water been the only cause. The disease on the other hand seems to be confined to certain houses or groups of houses and Fradereck[11] reports an instance where a house was burnt down in which a goitrous child had previously been born, whilst children borne in the house after being rebuilt were goitre free - the water supply in the meantime remaining unchanged. From this he concludes that goitre is a house disease and is spread by household furnishings such as bedding and clothing. Furthermor the alleged cases of goitre resulting from the drinking of water of goitre wells is to be explained by the living with goitrous families where the disease was transmitted by contact. Now whilst there is a good deal of truth in the spread of goitre by contact, there is an obvious flaw in the argument.

As goitre may occur in one member of a family and not appear in others although they may be all residing in the same house or come into contact with each other in occupational pursuits of life. One would expect a uniform distribution of the disease on these grounds and not a selection at random of its victims. Neither does it account for the presence of the disease in one area while an immediate neighbour is goitre free. This brings us to the infective theory of McCarrison which seeks to prove that water is one of the ordinary means of conveying the toxic agent of the endemic as seen from the results of the administration to young men of the residue separated by filtration from goitrigenous waters. The toxic agent is a living organism which is the cause of goitre. Whilst water is the principal means of transmission soil may also become a vehicle, in fact any soil irrespective of its geological nature may become a medium through the presence in it of animal or vegetable matter. Moreover the seat of the infection is the intestinal tract as evidenced by the production of the disease in animals by feeding them either on the foecal matter from goitrous patients or cultures made from goitrigenous faeces and by the beneficial effect of vaccines made from the intestinal organisms, and the use of intestinal antiseptics. Furthermore the restitution of the normal drainage of the bowel in persons suffering from constant constipation and intestinal stasis

associated with goitre by means of short circuiting and other surgical means causes a marked reduction in the size or disappearance of the goitre. On the other hand Moolten[12] states that the infective theory has to be accepted as an accessory factor in view of the light thrown on the subject in America. The concensus of scientific opinion then tends to regard goitre as a deficiency disease. Plummer, Kendall and others have shown that iodine is essential to normal thyroid activity, that subiodism produces structural as well as functional changes in the thyroid, and that the physiological action produced by thyroid extract is always proportional to its iodine content, and the diminution in the iodine content is inversely proportionate to the degree of hyperplasia. The role of coexisting focal infection must, however, not be too lightly considered. It occurs with a regularity too great to permit it to be held merely as a coincidence. The sites most connomly involved are the teeth, the tonsils, the gastro-intestinal tract or one of the nasal accessory sinuses. Having reached the intestine ~~these~~ three courses are open to the exciting agent. It may reach the thyroid and exert its noxious influence in the gland itself ~~and~~ or invade the blood stream and cause a chronic infection there, or remain in the intestinal tract producing its harmful effects there which on absorption causes the changes in the thyroid. Many attempts have been made

to find in the tyroid gland evidence of the nature of the exciting agent by histological and haematological examination or by the use of blood cultures from the thyroid, but in all cases results have been negative. Neither have the numerous observers who studied the blood recorded the presence of blood parasites which can be definitely accepted as the causal agent. The blood changes in endemic goitre give an indication that perhaps in the intestinal tract is to be found the seat of the disease, as similar changes are met with in some intestinal infections[13]. We are therefore led to consider that the changes may be due rather to a toxic substance circulating in the blood stream and emanating from the intestinal tract. Metchnikoff[14] has shown that certain of the normal intestinal flora are harmful by virtue of the poisonous substances such as indols and phenols which they produce and which cause degenerative changes in the liver and arteries and kidneys, and possibly also in the thyroid. The close relationship existing between the thyroid and the intestinal tract is shown by the fact that in some lower animals such as the amphibions the secretion is poured directly into the buccal cavity in order to exert its anti-toxic and bactericidal action in the alimentary tract. Moreover, in man, ligature of the bile ducts has lead to thyroid enlargement, owing to the absence of the biliary antiseptic action in the intestinal contents, as it could only by enlarging produce sufficient secretion to

combat the increased toxicity of the intestinal contents. The thyroid is called upon to combat several poisons normally present in the human intestine, but when to these are superadded the specific virus of goitre an abnormal element is introduced causing an extra strain on the gland. Unassisted it undergoes hypertrophy in many cases, but on assistance in one direction it is capable of performing the additional task imposed on it, and of combating the abnormal virus. The exciting agent is discharged from the body in the faeces, and on reaching damp soil containing a proportion of organic matter continues to flourish. On reaching organically impure water and stagnant water protected from the effects of light and air such as in wells it may continue to survive a considerable time. Further evidence of the contamination of waters by intestinal contents is afforded by the presence in certain waters of the bacteriophage which is responsible for certain obscure phenomena noted from time to time in the routine bacteriological examination of drinking waters. An instance of this which has now become classical is the observation of Hankin[15] upon the bactericidal properties of certain Indian river waters. It was observed that the water of the Jumna river just below Agra contained over 100,000 organisms per Cc. whilst five kilometres further down only 90 to 100 per Cc. were present. This phenomenon he attributes

to the effect of a volatile substance which he failed to isolate. Further investigation showed that in test tube experiments the filtered water exerted a marked action on the vibrio cholera, whilst after boiling no such action was present. Dr, Hetelle who has redirected attention to these experiments considers it an undoubted example of bacteriophagic activity. In connection with the whole question of the activities of these widely disseminated substances in drinking water is seen by the decrease in the bacterial content which takes place in many waters on storage, no doubt due to bacteriophagic action. This observation is of importance in that thereby can possibly be explained such features of the endemic as the fluctuation in its intensity, its preference for certain areas, its disappearance from others and its distribution by certain soils and certain water amongst other features of the endemic. As there are periods during which the bacteriophage varies in its activity there results a corresponding variation in the activity of the goitrigenous factor, so that a goitrigenous Water would possess such properties to a high degree at times, whilst at others they would be very small. Individuals partaking of water when the bacteriophagic activity is at its maximum would therefore be afforded a greater opportunity of escaping the disease than those who partook of it

when the bacteriophagic activity was at its minimum. The same argument applies to those who come into contact with infected soil. Should there result a period when the bacteriophagic activity is at its maximum, both in the water and in the soil, there would result a diminution, and if sufficiently prolonged a natural disappearance of the goitrigenous factor, whereas should it slacken in its activity in either or both of these media, then the disease may reappear. Consequently there results periods of fluctuations in the endemic. Whenever the bacteriophage is absent and where conditions are such as to hinder its activity there the goitrigenous agent may make its appearance and flourish. In proof thereof is seen the rapidity with which goitre spreads in a previously unaffected area amounting even to an epidemic. Now in persons suffering from intestinal toxaemia a strain results on the activity of the bacteriophage when, owing to a sudden in crease in the virulence and activity of the toxaemia, toxins are capable of absorption into the blood stream, but after a period of activity there results an exhaustion of its action and the bacteriophage is again able to reassert itself. During such a period there is a call on the thyroid to combat the absorbed toxins by the anti-toxic power of its secretion, and in order to produce a sufficient quantity it has to hypertrophy, whilst at the same time a failure in

absorption of any iodine in the intestine takes place. In a developing goitre the increase in size takes place in a step like manner, that is to say, at those periods when the bacteriophagic activity being overwhelmed toxins are absorbed, but as the process diminishes the bacteriophage is able to reassert itself, and the necessity for the gland to enlarge ceases to exist. However there may be a repetition in the process, the gland each time enlarging and diminishing in size during the interval until finally its powers of recovery are exhausted when it remains permanently enlarged. Should there be a considerable interval between each extension the bacteriophage is able to reassert itself, but where the intervals are short the bacteriophage is so rapidly overwhelmed and its activity so exhausted that the amount of toxin absorbed becomes very great. Hence there arises the necessity for the thyroid to hypertrophy more and more, until it too becomes overwhelmed by the toxaemia. This is quite in accordance with the fact that the more intermittent the goitrigenous agent is in its action the longer are degenerative changes delayed. The bacteriophage is the first barrier in the path of the toxaemia, the thyroid helping to close any gaps in its defence. This view further is in accordance with the measures adopted for the treatment of goitre. In the first instance the treatment by iodine owes its efficiency to the fact that thereby the

gland is supplied with a sufficient quantity from which to manufacture its active principle, or in the case of ~~thyra~~ thyroid extract or thyroxin the active principle is supplied which enables the gland to come to the rescue of the bacteriophage by combating the toxaemia. The use of intestinal anti-septics combats the toxaemia which enables the bacteriophage to reassert itself so that there no longer results the necessity for thyroid enlargement. Furthermore, by such measures absorption from the intestine of substances necessary for the thyroid gland takes place again. Plummer[16] has shown that thyroidin and dessicated thyroid are not readily absorbed from the intestinal tract from many persons suffering from goitre. The efficacy of a combination of these two measures is therefore obvious, and has been well illustrated by an observation of Walton[17] who showed that if the syrup of the iodide of iron is administered to twenty cases, and to another twenty intestinal anti-septics, about fifty per cent of each recover, but if the two are combined a further forty per cent recover. Now it has been shown by Dr. Chalmers Watson that after the administration of intestinal anti-septics there is no decrease in the number of organisms in the faeces, so that the beneficial effect would result by the combating of the toxaemia. Neither have any organisms of intestinal origin been discovered in the circulation, or in the thyroid

itself. So that the obvious conclusion is that we are dealing with a toxaemia. Not every case of intestinal toxaemia develops goitre provided the rate of production is such as can be controlled by the activity of the bacteriophage, and the amount of thyroid secretion normally poured into the circulation is sufficient to combat it. It is the sudden increase in the quantity and quality of the toxin that overwhelms the bacteriophage and permits absorption in the same way as a sudden rise in the blood pressure causes the vessel to rupture and the blood to escape. The sudden absorption of toxins in excess of that, which can be controlled by the thyroid secretion normally in the blood, causes the thyroid hyperplasia in order to produce the increased quantity of secretion to combat the increased quantity of toxin. The sudden increase in the absorption occurs when, owing to the defective action of the large bowel, it causes a damming back of the contents of the small intestine, the production of toxins in this situation occurring very rapidly and more readily absorbed than in the large intestine. Proof of this is seen by the intense toxaemia which results from obstruction in the small intestine especially in the upper parts as compared with that of the large bowel. On the other hand if efficient drainage is established in the large bowel the beneficial effect extends to the small intestine as well. If to the toxins of intestinal origin are

superadded those from the mouth, the nose and accessory sinuses, or from any other septic focus, the chances of its extension are therby greatly increased. Now in cases where the endemic is of moderate degree women are affected to a greater extent than men, and under all circumstances the disease is very liable to date its origin back to pregnancy. It is said that during pregnancy a certain amount of thyroid enlargement is normal, and those women in whom thyroid enlargement does not occur during pregnancy eclampsia is very liable to result. Now eclampsia is essentially a disease of primiparae so that the thyroid enlargement in subsequent pregnancies must be due to a different factor at work. On the other hand the enlargement of the thyroid during the first pregnancy is not an indication that eclampsia will not result, but rather an indication that the thyroid is in difficulties and requires assistance. The aetiology of eclampsia at the present day is that of an auto-intoxication the nature of which has not been determined, but the beneficial effects resulting from the clearing of the bowels is a strong indication that if not the whole, a large part of the cause lies there. During pregnancy there result ideal conditions for the production and absorption of intestinal toxics. In addition there is a strain thrown on the gland owing to the altered state of

of the maternal metabolism. A combination of these two factors would readily account for the large number of goitres developing during pregnancy, as during that period owing to the additional strain it is not in such a favourable position to come to the rescue of the bacteriophage. During lactation the same holds good to a lesser extent, and there are in consequence fewer cases dating back to that period. Whilst at puberty the thyroid is actively engaged in the awakening of the sexual sense this is also the period at which intestinal toxaemia often make their presence felt. As regards the occurrence of goitre in children a strong proof of the action of toxins is the phenomenon known as "growing pains" which has been shown by Dr. Chalmers Watson to be the result of a mild toxaemia. Moreover the beneficial action of thyroid extract in this malady is to be accounted by its anti-toxic properties on the blood, which combats the toxins and so enables the bacteriophage to reassert itself. The toxic state of the child's circulation is well illustrated out by an experiment carried out by him in the Royal Infirmary with urines from the Sick Children's Hospital from children who showed no lesion of the kidneys, and in every case the urines showed the catarrhal state of the urinary passages, and the frequent occurrence of Bacteriuria ~~cretinism~~. The occurrence of goitre in breast fed children is one of the striking features of the disease, and whilst it has been shown

that puppies from thyrodectomised bitches are frequently born with large goitres this may be well accounted for by the overwhelming of the bacteriophage by the intestinal toxins during pregnancy as the result of the withdrawal of the anti-toxic power of the thyroid secretion.

The geology of Weardale is contained within the limits of the Yoredale rocks or the higher carboniferous or mountain limestone - the middle strata of the carboniferous system. The "Great Whinsill" is the base of this stratum, and the millstone grit the highest as it tops the higher hills on each side of the valley. The "Little Whinsill" or three post limestone forms the bed of the river Wear. Between these two series of rocks are found in an ascending order limestones, hazels (sandstone and grit) and numerous shale beds to which the distinctive name of the coal measures is generally applied, and comprises a great variety of sedimentary deposits, having numerous beds of coal interstratified with them. None of the primary or lower palaeozoic rocks come to the surface or crop out in Weardale. Weardale is composed very largely of the carboniferous limestone and millstone grit, and it has been suggested that limestone has something to do with the causation of goitre. Analysis of the water shows that there is less than four grains of salts of lime to the gallon, and less than two grains of ~~floric~~ ferric salts. The water

is soft and free from organic and animal pollution being almost entirely supplied by an upland surface moorland. The distribution of goitre in Weardale is interesting. From the head of the Wear for about the first thirteen miles coinciding with the occurrence of limestone goitre is very common. Five miles further situated on gravel goitre also occurs to a considerable extent, whilst on the millstone grit and the coal measures it is also found to a considerable degree. It would therefore appear that the limestone formation favours its occurrence. The geological distribution of Teesdale is similar to that of Weardale, yet goitre is practically absent from that area, and also in the very centre of the Weardale district at Croxdale. It has been suggested that the mountainous hills of deep valleys in Weardale cut off from the floor of the valley a certain percentage of sunlight which might be the causal factor. The amount of sunlight cut off by the hills is small compared by such towns as Sheffield and Middlesburgh which suffer from their pall of smoke, yet these towns show no undue prevalence of goitre. Whilst at first sight the prevalence of limestone appears to favour the occurrence of goitre one would expect from its extensive distribution in Weardale that goitre would be universally distributed throughout Weardale. On the other hand it is not confined to this series, as it occurs also on the millstone grit and the coal measures, and is absent from areas where limestone

abounds e.g. Walsingham to the mouth of the Wear at Sunderland and at Croxdale and in Teesdale. The limestone theory therfore becomes untenable. Analysis of the water supply affords a further set-off for the limestone theory. Neither has a deficiency or absence of iodine in the water supply or in the food been demonstrated. It is when the beneficial effects of intestinal anti-septics in early cases of goitre are considered that the source of the causal factor is discovered and leaves no further room for doubt.

SYMPTOMATOLOGY etc. OF GOITRE.

Before the symptoms are discussed it is well to draw attention to a few anatomical points which will greatly facilitate in dispelling any difficulty in understanding the mode of production of many of the symptoms. The thyroid gland consists of two lobes and an isthmus embracing the trachea like a horse-shoe, the isthmus covering the second, third and fourth tracheal rings but may extend as high as the cricoid cartilage[1]. Arising from the isthmus there is sometimes a pyramidal lobe extending upwards in the median plane as far as the hyoid bone representing the remains of the thyro glossal duct. Accessory thyroids are to be found either in the neighbourhood of the hyoid bone or in the mediastinum as low down as the aortic arch. Surrounding the thyroid is a dense capsule from which pass upwards bands of fascia to the thyroid cartilage. This arrangement of the fascia explains the up and down movement of the thyroid during deglutition, a most important feature and characteristic of the thyriod only. The posterior and inner surfaces of the lateral lobes lie in contact with the cricoid, the thyroid cartilages, the trachea, oesophagus and inferior laryngeal nerves. These ~~relative shapes~~ relations are of extreme importance and for a proper understanding of the mode of production of some of the pressure symptoms it is essential to keep

them constantly in mind. In front of the lateral lobes lie the superficial muscles of the neck - sternohyoid, sternothyroid, omohyoid and sternomastoid muscles. The internal jugular vein, carotid artery and vagus nerve lie to the posterior and inner sides of the lateral lobes. The carotid artery is displaced outwards and backwards in enlargement of the lateral lobes which forms a distinguishing factor between glandular swellings and tumours in this region as in former the artery is in the centre of the mass and not displaced outwards as in the latter[2]. Entering the upper and lower poles of each lobe are the superior and inferior thyroid arteries which may enlarge considerably in goitre giving it a distinct pulsation apart from the deeper lying blood vessels. Lying between the trachea and oesophagus towards the inner side of the lateral lobes are the recurrent laryngeal nerves. A great many goitres, at least for a considerable time, do not have any history and do not betray their presence by mechanical or functional symptoms. In the early stages when symmetrically placed they give to the neck a soft roundedness called "swan neck" which is considered in many countries as one of the attributes of feminine beauty. That many of the artists of the past century shared this view can be readily seen from many art galleries. On the whole a goitre is a soft usually uniform enlargement with one lobe usually

but not invariably, the right predominating. There is often considerable pulsation in the neck. The swelling does not as a rule progress in size in a uniform manner but may even disappear for a time only to reappear later. The swelling is unattended by symptoms, and the enlargement after attaining a certain size subsides to the size at which it remains stationary. Spontaneous recovery in young subjects is not uncommon on leaving the goitrous districts. Such a train of symptoms is said to constitute a first attack, the gland tending to recur to the normal as nearly as possible but leaving the thyroid larger than before. Successive attacks cause the gland to increase in a step like manner until degenerative changes occur when it no longer attempts to revert to the normal as its powers of recovery are at an end, but should the goitrigenous influences be intermittent these degenerative changes are delayed. In long standing goitres pressure symptoms appear. Respiratory disturbances may be present, and are due to the mechanical constriction of the trachea, rarely to mechanical injury to the nerves of the larynx. Functional disturbances of the heart may be due to the mechanical impairment of the venous circulation partly, and partly to the disturbance of respiration, rarely to compression of the cardiac nerves. It is however unusual to have cardiac disturbances in simple goitre except as the result of the mechanical effects of the enlarged thyroid. The mechanical

effects are, however, not in proportion to the size of the goitre but depend on factors which have been pointed out in the first chapter. Of the symptoms produced by goitre one of the most important is dyspnoea, the mode of production occurring in various ways. (a) Direct pressure on the trachea is the commonest and most important and may be combined with any or all of the following. (b) Pressure on or irritation of the recurrent laryngeal nerves. (c) Direct extension into the interior of the larynx and trachea as in malignant disease. (c) Direct rupture of a cyst into the air passages. (d) Sudden haemorrhage into the gland or a cyst thereof causing a rapid and dangerous increase in the size of the gland. (e) Oedema of the glottis or mucous membrane of the trachea. (f) Venous congestion of the ~~surgical~~ cervical region and the upper part of the mediastinal space from pressure on the venous trunks. Dyspnoea is a slow developing symptom and at first there is no indication of shortness of breath, but with time it is discovered that all is not well with respiration. Gradually respiration becomes more laborious until owing to pressure ~~the trachea~~ becomes so narrowed that a whistling inspiration is heard - the so-called tracheal stridor, which is mostly inspiratory. Dyspnoea may be paroxysmal or persistent. When compression even of a moderate degree has been present for a number of years a permanent congestion

of the entire respiratory passages takes place. Furthermore when the circulation in the lower part of the lungs become sluggish there is a marked tendency to congestion. Direct pressure on the trachea may cause displacement or compression of the trachea, which may be antero-posterior, lateral or circular and of these the commonest is lateral pressure. The lateral flattening of the trachea was first described by Demme of Zurich[4] and after him Rose[5] drew attention to the condition and further laid emphasis on the changes which take place in the wall of the trachea as the result of long continued pressure. Demme compared the shape of the trachea to that of the scabbard of a sword. The point of constriction is usually a little more than an inch or so below the cricoid cartilage. When the whole gland is enlarged the shape of the compressed trachea is always the same being laterally compressed. When the enlargement affects one lateral globe only the trachea is flattened on the side next to the enlarged lobe. In a median goitre in which the enlargement predominates in the isthmus antero posterior compression of the trachea occurs. The changes which occur in the trachea from the pressure of a goitre were first described by Rose of Zurich about twenty years ago. He maintained that long continued pressure produces not only changes in the shape and position of the trachea but also softening and atrophy of the trachea itself causing a progressive narrowing of the Lumen if not sudden collapse.

We come now to the second mode of production of dyspnoea by pressure on, or irritation of, the recurrent laryngeal nerves and of this mode of production there are two varieties:- (a) spasm of the adductors of the vocal chords, (b) paralysis of the abductors. The first theory assumes that when the recurrent nerve has gradually become paralysed by pressure it is the abductors that at first become affected, the unbalanced adductors then entering into a spasm which so narrows the space between them as to cause dangerous dyspnoea. When the paralysis becomes complete the cords take up the cadaveric position and the dyspnoea is relieved. In simple goitre one recurrent nerve is affected and the dyspnoea is slight;(c) by direct extension into the interior of the larynx and trachea never occurs in simple goitre, but in malignant disease such growths take place and frequently cause sudden death; (d) Oedema of the glottis may complicate malignant disease but never occurs in simple goitre and (e) by causing a swelling of the mucous membrane of the trachea occurs only, where the trachea has been compressed from without that the slight extra amount of narrowing so produced could lead to dyspnoea. That there exists a relation between goitre and the heart has long been observed.
6
Rose thought that goitre heart was due to pressure on the blood vessels of the thorax. Kocher added to

this that impairment of respiration was also the cause of goitre heart - the so-called dyspnoeic goitre heart.[7] Schrantz believed that goitre heart was caused by venous stasis in the thorax causing hyperaemia of the heart muscle and subsequently excitation of the cardiac ganglia.[8] To Minnich is attributed the goitre heart of pneumonic origin. There are two separate and distinct varieties of goitre heart:- (1) the mechanical goitre heart, (2) the thyrotoxic heart, and possibly a third distinguished by Kocher due to involvement of the cardiac nerves by a large goitre. These lesions although rare are usually unilateral when present. Theoretically injury to the vagi nerves should cause exaggerated cardiac activity owing to the unbalanced action of the sympathetic nerves, but practically it has no effect on the frequency of the cardiac action. Pressure on the blood vessels of the thorax was advanced by Rose by causing venous stasis in the thorax leads to a stasis in the right auricle and ventricle on which follows dilation and after a while degeneration of the cardiac muscle. The impairment of respiration also plays a part in the production of goitre heart. In inspiratory dyspnoea when a deep breath is taken to get sufficient air the thorax expands to its maximum thereby greatly increasing the negative pressure. Under such circumstances the blood is aspirated to the right

heart with great speed, but owing to the stenosis of the trachea the lungs don't follow the expansion of the thorax to the same extent as normally. Consequently the capillary blood vessels don't dilate and the blodd is not diverted into the lungs in the proportion to the amount running to the heart which has to dilate to accommodate the increased quantity. As a result the pressure in the pulmonary artery diminshes as also that in the pulmonary vein, in the left auricle and ventricle. If the heart muscle is good it will compensate by hypertrophy and equalise the pressures on the right and left side of the heart. If the cardiac musculature is defective there results cardiac failure. In expiratory dyspnoea during the effort of expiration the negative pressure in the thorax is greatly diminished, and for this reason blood is kept back in the tributory veins, and the amount coming to the right heart is considerably diminished. But in the following inspiration all this blood flows towards the right heart, and should there be chronic catarrh and emphysema of the respiratory passages pulmonary compensation by dilation of its capillaries cannot take place. The right heart becomes overwhelmed by the amount of blood running into it and there results dilation of the right auricle and ventricle. So the final results of inspiratory and expiratory dyspnoea are the same. Goitre heart is insidious in its onset, then there

results shortness of breath, later vertigo, headache, palpitation and all the usual symptoms of cardiac failure[10]. The thyroid toxic heart is best seen in cases of hyperthyroidism and is merely mentioned to complete the description. Dysphagia is a much rarer symptom than dyspnoea as the oesophagus lies behind the trachea and is less liable to be compressed. It is specially noticeable in intrathoracic and lingual goitres differing in no way from dysphagia otherwise produced. Vocal disturbances occur in large goitres and in malignant disease of the thyroid. The voice becomes thick and guttural as if the vibrations were muffled. This is due to the congestion of the mucous membrane of the larynx and a slight displacement of the insertion of the vocal cords so that they cannot ring true.[11] If to this is added muscular insufficiency and some involvment of the inferior laryngeal nerves changes in the voice appear, causing it to become bitonal. In benign goitres irritation of the inferior laryngeal nerves is always unilateral causing a tonic contraction of the vocal cords on the same side and gives to the voice its bi-tonal character. It may also cause spasm of the glottis causing spells of coughing that may be quite serious. Cough of the recurrent type is dry, loud, not accompanied by expectoration and paroxysmal, which distinguishes it from that arising from pressure on the trachea which is sonorous, metallic, persistent,

and accompanied by profuse expectoration. When paralysis is complete there results paralysis of the vocal cord on the same side and aphonia results. Later the vocal cord on the other side swings over the middle line and the aphonia disappears. The sympathetic, cervical and brachial plexuses are rarely involved by an innocent goitre but more commonly by malignant disease, in which case there results at first symptoms of irritation and later those of paralysis of these structures. Clinically it is very difficult to distinguish between sarcoma and carcinoma. The former is more limited to one lobe and grows rapidly, whilst the latter at an early stage involves both lobes and has a somewhat slower course. Exceptions are however very common. In the early stage when still confined to the capsule there is no means of diagnosing the disease. When however the tumour becomes hard and irregular, rapidly increases in size together with dysphagia, pain in the neck shooting up the side of the head and neck or down the arm, there is no difficulty in the diagnosis. Later the growth pierces the capsule, involves the surrounding structures, the vocal cords become involved and penetration of the trachea results. The growth becomes adherent to the carotid artery and the internal jugular vein. Its relation to the carotid artery is of some diagnostic importance as a

malignant goitre tends to infiltrate whilst a simple goitre displaces the artery. Fixation of the tumour is an important sign but so long as the tumour does not become adherent to any fixed structure, such as the larger muscles of the neck, it may still continue to follow the movements of the larynx and trachea. Expectoration of blood is an unusual symptom, occurs late and is of grave omen indication penetration of the trachea. Death is caused in both sarcoma and carcinoma by extension of the growth into the air passages; the mechanical obstruction so produced may cause fatal dyspnoea. Ulceration of the trachea may set up a septic process in the tumour which may rapidly cause death. Penetration of the veins in and around the tumour especially in the case of sarcoma frequently leads to the occurrence of metastases in the lungs and bones. The secondary growths in bone have a remarkable tendency to reproduce the structure of the thyroid with its epithelial cells containing colloid matter. Sudden haemorrhage into the softened tumour may also cause sudden death.

Diagnosis of Goitre

In the majority of cases diagnosis of goitre presents no difficulty. First of all there is the history which may help if the patient comes from a goitrous area, or if other members of the family are affected, or if there are symptoms of pressure. In

dealing with a swelling in the neck it is necessary to discover whether the swelling is the thyroid and what its nature. On inspection there is one physical sign which is practically pathenemonic of swellings of the thyroid viz. the up and down movement of deglutition which rarely fails unless the swelling is large or where it has a long pedicle. There are other sources of fallacy. In the first place a swelling which is not thyroidal in origin may present this sign such as cysts of the subhyoidean region which lie in the middle line on the level of the upper border of the thyroid cartilage. A large cyst of this kind may possibly be mistaken for a tumour of the upper pole of the thyroid or of the pyramidal lobe. Tumours, innocent and malignant, springing from the trachea or larynx and growing outwards may occasionally simulate swellings of the thyroid. Various swellings having their origins in the tissues external to the trachea and larynx may become adherent to them secondarily, and so participate in their movements. The shape of the enlarged thyroid may be very characteristic, and on the other hand of no diagnostic value. When the gland is uniformly enlarged as in the early stages of simple goitre it presents an appearance similar in shape to that of the normal thyroid gland. This is usually horseshoe in shape but every deviation from this shape may be met with. The size of the thyroid swelling varies although it is amongst the cystic cases that the largest goitres are found.

The degree of prominence varies also, some present scarcely any external swelling, others form huge projecting masses more or less pedunculated and may even hang over the chest for some considerable distance. 12
Pulsation in the neck and dilation of the veins may or may not be visible also. Palpation is begun by ascertaining the exact position of the thyroid, the cricoid cartilages and the trachea to see if they are displaced. After that the lobes and the isthmus are investigated and their consistency, mobility and surface are investigated as also the relationship to the surrounding structures. In the vast majority of cases the goitre is more mobile transversally than vertically, adn during deglutition it slips out of the hand to follow the movements. As regards the position of the thyroid it varies according to which part of the gland is involved. The swelling may be in the middle line when the enlargement affects the isthmus alone, or more commonly, the isthmus forming the most prominent part of the whole gland. The relation of the thyroid swelling to the muscles of the neck is also important, and of these the steromastoid demands attention. This muscle, if the tumour is of sufficient size, is always displaced outwards, the swelling lying to the inner side of the muscle. If bi-lateral both sterno-mastoids become displaced outwards. A large number of tumours especially of lymphatic origin at first sight closely

resemble tumours of the thyroid, but differ from the latter in that they displace the sterno-mastoid to the inner side. The infra hyoid muscles spread out over the front of the tumour but their exact position is not easily determined and is not of diagnostic importance. Next comes the position of the swelling with regard to the big vessels of the neck. As the thyroid swelling originates to the inner side of the carotid sheath the latter becomes displaced outwards and backwards so that the carotid artery may be found pulsating at the posterior and inner part of the tumour, and this is its usual position when the thyroid swelling is of an innocent nature. On the other hand when the thyroid is the seat of malignant disease the artery is frequently displaced to a lesser extent being simply surrounded by the tumour. The position is therefore of some diagnostic value. The position with regard to the sternum and clavicle is of prognostic rather than of diagnostic value. A thyroid swelling unless small generally extends as low as the upper border of the bone but may descend below this level. Pulsation may be detected by placing the flat of the hand over the goitre. Pulsation is simply due to the close proximity of the carotid artery which communicates its pulsation to the adjacent mass. Sometimes the pulsation felt is not that of the carotid artiery but that of the superior thyroid artery which runs along the anterior and inner border of the lateral lobe of the thyroid, or of large arterial branches running over

the goitre - the so-called vascular goitre. The consistency of the gland may vary from extreme softness to stony hardness. Furthermore simple goitre is painless to the touch and freely mobile under ordinary circumstance. Auscultation will tell if there are any adventitious sounds in the gland as well as compression of the trachea in which case there is a rough inspiration followed by a long loud ~~expectoration~~ expiration. Finally, auscultation reveals the state of the heart and lungs. Laryngoscopic examination reveals the state of the vocal cords and is specially useful before operation. X-ray examination is of value in determining the position and state of the trachea and the presence of calcareous deposits of the gland. Estimation of the basal metabolism is of value in determining the degree of hypothryoidism, the presence or absence of any toxicity of an adenomatous ~~thyma~~ thyroid and of revealing early cases of transition to the thyrotoxic state and as a guide to treatment. As regards the examination of the blood the picture is not sufficiently characteristic to warrant a diagnosis. The number of lymphocytes is diminshed as well as the haemoglobin index. The polymorphs are below normal, the mononuclears are above the normal, the large mononuclears are within the normal limits and the eosinophiles increased as well as the coagulability of the blood. No organism, bacterial or protozoic, has been found either in the general circulation or in the thyroid pathognomonic of the disease. We next study the various types of goitre commencing with the simplest

variety. This is commonly seen at or near puberty or in adolescence. As a rule there is a diffuse enlargement of the entire gland affecting all its parts. One lobe, usually the right, predominating in size. The swelling which has more or less retained its original shape is painless, does not pulsate or fluctuate. Symptoms are slight or absent and there and there is no difficulty in recognising this type of goitre. In colloid goitre there may be no symptoms either or those resulting from pressure on the surrounding structures. Like the simple goitre it may present a uniform enlargement of the whole gland but more commonly one lobe predominates in size. On the otherhand the gland may have lost its regular form, colloid degeneration in one lobe being more marked than in the other causes this irregularity in the form of the gkand. Its surface is lobulated and firm in consistency but this may vary considerably . Fibrous goitre is characterised by its firm consistency, this being less so than in the calcareous variety. In cystic goitre the surface is smooth, the swelling is mobile, elastic and fluctuating. In genuine non-toxic goitre without degenerative changes the tumour can be reduced by compression.[12] An adenoma of the thyroid is manifested by an enlargement which is nodular in character, single or multiple and of variable size. Its consistency is firmer than the rest of the gland unless cystic degeneration is present when it is softer. Moreover an asymmetrical enlarge-

ment of the thyroid is practically conclusive proof of an adenoma only.[13] Should haemorrhage take place into its substance it varies in size, shape and consistency. The general symptoms here are those of colloid goitre with the exception that with time symptoms of hyperthyroidism may appear of which cardiac disturbances form a prominent part.[14] As regards malignant disease it should at once be suspected if the pre-existing goitre or the thyroid increases rapidly in size and becomes adherent to the surroundings. Pain becomes a prominent symptom, the voice becomes hoarse and resolves into aphonia. Interference with deglutition results from pressure on the aesophagus, cyanosis and oedema of the face and neck from pressure on the large veins of the neck. The skin may become red and ulcerated, and in the late stages of the disease, ulceration of the trachea and oesophagus, resulting in haemorrhage occurs. Rapid emaciation , a remittent temperature and death from exhaustion, starvation or intercurrent disease concludes the picture.

Classification of Goitre.

A satisfactory classification of the various swellings of the thyroid is not easy owing to the difficulty of bringing into line the clinical with the pathological factors. Generally speaking goitres may be divided into two large groups according to the state of activity of the thyroid into hyper-and hypothyroidism.

By means of this classification diseases of the thyroid are split into directly opposite varieties and in a well marked case of each there is no difficulty in recognising the contrast in the clinical picture. The hyper-activities of the gland may be dismissed here. Of the hypo activities too much cannot be said. Hypothyroidism is again subdivided into the two big sub-groups - simple goitre and (myxoedema / cretinism). of simple goitre there are again sub-divisions as follows:-

(I) Simple Hypertrophy	(1) Physiological	(puberty / pregnancy)
	(2) Non toxic	
	(e) Toxic.	
(II) Colloid	Cystic.	
	Fibrous.	
	Vascular.	
	Calcareous.	
(III) Adenoma	(a) Diffuse.	
	(b) Foetal	
(IV) Malignant Tumours.	(1) Epithelial	(Malignant Carcinoma.
	(2) Connective tissue.	Sarcoma.

Prognosis of Goitre

The prognosis of goitre is very indefinite as there are so many factors which may influence the behaviour of the endemic. Spontaneous recovery is quite common specially on leaving the goitrous area and a reappearance of the disease on return is equally common. Newcomers to an endemic area very quickly fall a prey to the disease, the liability increasing with the lengths of time of residence, whereas the extension in a previously non-goitrous area may be so severe as to constitute an epidemic. The endemic prevails especially in rural districts, and whilst common in towns its intensity is never so great as in rural districts. Up to puberty goitre affects the two sexes almost equally, being somewhat more common amongst girls. From the age of puberty onwards females are more liable to suffer than males. The sex incidence is, however, very variable in different localities depending on the severity of the endemic. When slight the disease is met with only amongst women but in regions of high endemicity the proportion of men to women sufferers approximates more closely. The influence of the child-bearing period is very great as a very large proportion of goitres arise at this time. When the endemicity is high the disease is met with in breast fed infants in which case it is congenital. The incidence in children depends to a considerable extent on the duration of the endemic, and on the degree to which a natural resistence to

the disease has developed amongst the inhabitants. In regions where the disease has operated for centuries goitre in children is rare, whereas the more recent the endemic the more does it prevail amongst children. Children subjected to the goitrigenous influences for the first time are more susceptible than adults, the susceptibility increasing as puberty is approached, but with increasing age it diminishes in the case of males and increases with females during the child-bearing period. After 45 it rarely develops in either sex, but if so the tendency towards malignancy is very great. Children born of goitrous mothers suffer from a congenital instability of the thyroid which renders them more apt to develop the disease in later life than those born of healthy mothers, especially should they reside in an endemic area. Those whose calling necessitates contact with infected soil as amongst the labouring classes in rural districts the liability to contract the disease is very great, as also an occupation leading to gastro-intestinal disorders, especially if there is superadded oral sepsis. Much depends also on the duration of the disease. In young children the goitre disappears in most cases under treatment or spontaneously, or it may continue to develpp in spite of treatment into toxic goitre. In adults those that disappear in early life may reappear again, most of them during pregnancy, whilst those that remain from childhood and those that

appear in later life may persist unchanged for many years. Once maturity of the individual is attained there is little tendency for the goitre to disappear spontaneously. It may be generally said that when a goitre has been in existence for more than three years the chances of its resolving with medical measures are very remote. Many of the simple goitres become toxic, only to subside again or remain toxic. A few develop into typical exophthalmic goitres, but the most present toxicity without exophthalmos. A good deal depends also on the activity of the exciting agent. The more intermittent its action the greater the chances for the gland to revert to the normal, and the longer are degenerative changes delayed. There is also the question of symptoms produced by the goitre as these give rise to conditions which by themselves endanger the life of the patient, Pressure symptoms, apart from those produced by a haemorrhage into a cyst, are more often than not associated with malignant disease of the gland. Lastly but not least there is the response to medical measures. A goitre which has not responded after a fair trial in three months is not likely to be benefited thereby. Associated with the iodide treatment of simple goitre there is always the danger of the conversion of non-toxic into toxic goitres. The high mortality after operation is chiefly due

to pneumonia but there are few diseases of equal magnitude in which the operative prognosis is so good. In long standing cases the heart and lungs may become affected which may invite complications, but heart failure is little to be feared in operation for simple goitre.

Summary of 50 Cases.

In reading through the history of the 50 cases of goitre it is seen that, except for a few variations, the general trend is the same. The first point to observe is that the disease is insidious in its onset, and that it is essentially chronic in type. In many cases the swelling is discovered accidentally, or after some intercurrent illness especially if flesh has been lost about the neck. Furthermore, it has no respect for age or sex. Although the striking feature is its close affinity for the opposite sex especially during the child bearing period, it does not necessarily confine itself to any definite period of life. It is interesting to note the absence of symptoms apart from the disfigurement caused by the swelling in the neck. Apparently the insidious onset together with the chronic progress of the disease allows the general economy to accommodate itself to the new state of affairs. All through these cases the general cry has been the presence of a swelling or lump in the neck to which the usual popular causes have been attributed. There are also good grounds for believing that the enlargement of the thyroid takes place in a series of steps whereby it may attain a certain size, either remain the same for a period and then enlarge or disappear altogether. Once it has been the seat of an enlargement, unless the factors

contributing thereto are removed, it is merely a matter of time for it to go through the same process again. What apparently happens is that the thyroid enlarges to a certain extent in attempting to combat the aetiological factor. It either succeeds to hold its own after an enlargement to a certain extent during which the causal factor does not increase in the intensity of its virulence or, the causal factor having spent its force, the source of stimulation ceases to exist temporarily. It however has to remain on its guard and so remains enlarged to some extent. Sooner or later the process is repeated, this time the enlargement occurring to a greater extent either because of a larger dosage or increased virulence or both factors combined, which may necessitate the enlargement persisting for a longer or shorter period, but again it may spend its force. As a matter of fact the enlargement of the thyroid occurs in a series of waves - rarely does it attain a particular size for the first time and remain so. In the majority of cases it enlarges to a certain extent, maintains that for some time and then decreases in size again. This process goes on for a number of times until permanent changes have taken place when the enlargement becomes permanent. In the case of men on close cross-examination it will be found that although the neck band became too small at times there were others at which it was too large, but finally the enlargement became constant. In the case

of women, owing to the modern way of dressing this is not possible to ascertain. Furthermore, it is usually on the right side of the neck that the enlargement is first detected. This is apparently from the fact that normally the right lobe is larger than the left, and in that case the enlargement makes its appearance at an earlier date than if the disease has commenced in the left lobe or the isthmus. This raises the question whether the disease attacks one lobe at a time or the whole gland at once. According to a history it is usually on one side where the enlargement first occurs, that is to say, the swelling in the neck is at first visibly unilateral. This does not exclude the possibility that the rest of the gland is enlarged also although not visibly so, and on examination of a goitre the whole gland is usually found to be enlarged. It is said that a certain amount of thyroid enlargement is normal and that the thyroid varies considerably in size in different individuals at different times of life in the two sexes. As regards this it really is only a difficulty in borderline cases, and moreover such enlargements are transitory in nature as compared with the pathological. It has however to be remembered that repeated so-called physiological enlargements may give rise ultimately to goitre formation. Now the thyroid surrounds the trachea in the form of a horseshoe, but the pressure symptoms on the trachea are not proportionate

to its size. This is due to some extent to the fact that the trachea can withstand a certain amount of pressure, and if the enlargement occurs gradually the trachea is able to fortify itself pari passu with the altered state of affairs. It may be generally said that pressure synptoms are not proportionate to the size of the gland but rather depend on the mode of growth and the nature of the ~~arterial~~ various relations of the gland. A further feature of the thyroid enlargement is that it may disappear on the patient leaving the goitrous area and reappear on coming to the same district. This depends largely on the duration of the goitre before the change in locality takes place. As a general rule where a goitre has existed for any period more than three years it is not likely to be benefited by the change of locality owing to permanent changes having taken place. When the thyroid gland has attained a certain size forming a general enlargement, and it still continues to increase in size without degenerative changes setting in, an obvious feature on side view is the flatness anteriorly imparted to the swelling. This is no doubt due to the filling up of the hollows and a general levelling off of the anterior part of the neck. This flatness is disturbed in cases where changes occur either unilaterally or where they are not simultaneous throughout the gland. Thus a cyst of some size appearing in one lobe or in

the isthmus would cause that part to be more prominent, and so disturbs the phenomenon, and the same applies if degenerative changes have set in. Furthermore it is also an indication of a reduction in the size of the gland apart from palpation and measurement, because as the thyroid enlargement decreases, the structures on either side of the neck again become more prominent, and the flatness disappears. A striking feature of the endemic is the way in which it selects its victims. Those with a family history of goitre in one or both parents are very liable to suffer should they continue to reside in a goitrous area; most so is this the case when the disease has affected more than one generation. Of the cases in which the father was goitrous alone there is not such a tendency to develop the disease in the offspring provided the mother is goitre free. Whereas a goitrous mother is very liable to transmit the disease to the children even though the father is goitre free. As regards the place in the family it may be generally said that the later members are more predisposed to the disease especially should there be a large family and a rapid succession of births. This is apparently due to the strain which pregnancy exerts on the thyroid, but is not essentially the only cause, as it merely paves the way for the goitrigenous influences. Even though both parents are goitrous it does not seem to affect their procreative powers as in the majority of cases there are fair sized families. A fair number of cases seem to date back from influenza, and there

is no doubt that like any other acute infectious disease it may cause thyroid enlargement. On the other hand there is always the question of whether the subsequent loss of flesh did not bring to light a previously existent goitre. Although acute infections do have a deleterious effect on the thyroid gland the occurrence of a goitre following them is not common. It is when the chronic type of intoxication is explored that a more definite relationship comes to light especially that related to the alimentary tract. Commencing with the teeth in the vast majority of cases they are decayed, absent or have been replaced by artificial dentures. Associated with decayed teeth are swollen retracted purulent gums and in children in addition enlarged septic tonsils as well. The constant absorption of purulent matter from these foci leads to gastric and intestinal disturbances. In addition there is a superadded inactivity of the bowels. Evidences of chronic intoxication is seen by the sallow pigmented skin which is loose and harsh. The conjunctivae are muddy, the tongue is furred and the breath foul. Evidence of the septic state of the circulation is evidenced by the examination of the urine. In such cases on holding up the jar to the light a cloudiness is visible which on microscopic examination is seen to be due to catarrhal cells from the urinary passages in various states of degeneration. Organisms, gram negative, rod shaped, may be detectable but are

not so constant as the presence of the catarrhal cells. No symptoms directly referable to the circulatory venous or respiratory systems are seen in any of these cases nor is pain a feature of the disease. In young girls disturbances of the menses occur in a considerable proportion of cases. The examination of the blood is not sufficiently characteristic as to be pathognomoic of the disease.

Name: A.R., age 20, sex male, occupation shop assistant.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 7 months.

History, personal: In September of last year he fell off the landing in the shop where he is employed and hurt his shoulders and legs. These were merely superficial bruises but, owing to the resultant state of his nerves, he was forced to be idle for 3 months. About the middle of January of this year he began to be troubled with swelling in the left side of the neck, which he could detect quite plainly. It gradually spread to the opposite side until now it forms a fair sized goitre. There is no difficulty with swallowing or with his voice. His surroundings at home and at work are good and he takes his meals regularly. In childhood he suffered from scarlet, mumps and otitis media.

Family: Father killed in the war. Mother alive and well. 2 brothers alive and well. No sisters.

State on Examination: He is of fair intelligence, somewhat neurotic, stands 5 ft. 6 ins. in height and weighs 9 st. 12 lbs. There are no developmental errors, no signs of jaundice,

dropsy or cyanosis. Anaemia is well marked. Temp. 98.4.

Alimentary System: His appetite is variable but does not suffer from thirst. After a meal he is much troubled with belching of wind, heartburn and flatulence make his life a misery. His teeth are very decayed. The gums in these areas are swollen, congested, and pus can be squeezed from them. His tongue is very coated but there is no difficulty in swallowing. He often resorts to vomiting to get relief from distension after meals, and the bowels are regularly constipated.

Abdomen, Inspection: General distension, no retraction, abdominal wall poorly developed and movements poor.

Palpation: Tenderness over the appendicular region, under the left costal margin. Slight resistance in these areas. No fluctuation.

Percussion: Areas of dullness alternating with tympanicity.

Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid presents a horseshoe shaped swelling, more prominent on the left side, and shows the characteristic flatness well on side view. The swelling

follows the movements of deglutition, is not adherent to the surroundings, painless, non pulsatile and non fluctuating. The skin over the tumour presents several dilated veins, and pulsations are visible in the neck. On auscultation a haemic murmur is heard in the neck.

RBC = 4,650,000, WBC = 6450, Hb = 65%, CI = .6, DC = polymorphous 76% SL = 14% LL = 6% Eosin = 2% Basophyls = 2%

Urinary System: No pain in the back, urethra or bladder.

Urine: color, amber; reaction, acid; Sp.Gr.1015; large deposits of urates; no other abnormal constituents.

Microscopically: Amorphous urates.

Diagnosis: Parenchymatous goitre.

Prognosis: As there is no family history of goitre and the disease is still in an early stage it will doubtless yield to treatment, provided the gastro-intestinal disorder is remedied. Owing to his neurotic condition a rapid improvement is not to be looked for.

Treatment: Calomel gr.II is given nightly for a fortnight. Then Thymol gr.X and Thyroid extract gr½. each in tablet form are taken alternately nightly for 3 weeks. The extract is then taken twice a

week, then once a week and left off for 1 week. Treatment to be continued for 3 months. All fats, oils and alcohol to be avoided and all potable waters previously boiled. A change in residence is very desirable.

Name: G.T., age 19, sex male, occupation coal miner.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 18 months.

History, personal: During the early part of last year he was working in a very hot part of the pit and, as he could not take sufficient water with him, he was forced to drink the water in the mine. At first he rather hesitated but as he saw no ill effects in doing so he continued the practice. About 3 months later he thought his neck was getting rather thick and, as far as he knows, the swelling first made its appearance in the middle line of his neck and as it moved up and down he thought it was his "Adam's apple" that was getting prominent. There is no difficulty in swallowing and no hoarseness of voice. As a child he had appendicitis, bronchitis and influenza. No accidents.

Family: Father alive and well. Mother alive and well. 2 brothers alive and well. 3 sisters alive and well.

State on Examination: He is a youth of average intelligence, 6 ft. in height and weighs 10 st. 12 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia.

Temp. 98.4.

Alimentary System: His appetite is good, and he is not usually ~~very~~ thirsty. Before, during and after meals he is quite comfortable. No heart-burn, waterbrash or flatulence. His teeth are good, his tongue clean, no difficulty in swallowing. His bowels are regular.

Abdomen, Inspection: Slight prominence centrally, abdominal wall well developed and movements good.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and lymphatic glands are not enlarged. Situated in the position of the isthmus of the thyroid is an oval swelling almost the size of a pigeon's egg, projecting forwards and following the movements of deglutition. The skin over the swelling is found to occupy the position of the isthmus, the rest of the gland being enlarged to a lesser extent. The swelling is painless, not adherent to the skin, non pulsatile and non fluctuating.

RBC = 5,300,000, WBC = 7000, Hb = 95%, CI = .9,

DC = polymorphous 74%, SL=20%, LL=4%, Eos=2%.

Nervous, Respiratory and Circulatory Systems:

Nothing to note.

Urinary System: No pain in back, bladder or urethra.

Urine: color, light straw; reaction, acid; Sp. Gr. 1025; a deposit of mucus. No other abnormal constituents.

Microscopically: large numbers of catarrhal cells A few gram negative organisms are visible.

Diagnosis: Colloid goitre.

Prognosis: The prognosis is good provided the entrance of the goitrous ~~germs~~ factor by the water or soil can be prevented. A change of occupation would be best of all. The disease is of comparatively short duration and will respond to medical measures.

Treatment: The exciting factor has entered through the partaking of goitrous ~~germs~~ water. Hence the aim is to remove it before any success of the treatment is to be looked for. Again a II gr. tablet of Calomel is taken nightly for a fortnight. Then gr.X of a Thymol tablet nightly alternating with a tablet of Thyroid extract gr.½ at night for 3 weeks. Then the Thymol tablet is taken only twice weekly and then once weekly for a further period of 3 weeks. It is then left off for 1 week. Such treatment is to be pursued for 3 months. In addition, a change in occupation and in the area in which he lives would prevent a return of the disease. All potable waters to be boiled previously, all fats, oils and alcohol to be avoided.

Name: Mrs. F.H., aged 64, sex female, occupation at home.

Place of Bith: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 40 years.

History, personal: When 24 years of age she had her first baby and during her pregnancy her doctor drew her attention to a swelling in her neck which she believes was a goitre. She was given medicine for it and it disappeared. 2 years later it reappeared during her pregnancy and this time she painted the swelling with iodine, but it grew rapidly and remained enlarged even after she had weaned her child. Otherwise she suffers no discomfort from it apart from its size. She lives under fair surroundings, takes her food regularly and as a child had measles, mumps and eczema. No accidents.

Family: Father died of an injury. Mother died of influenza. 2 sisters alive and well. No brothers. All her children are healthy.

Her menses started at 14 and are usually regular. Her pregnancies were all full time and quite uneventful.

State on Examination: She is of fair intelligence, presents no developmental errors, shows no signs

of jaundice, cyanosis or dropsy. Considerable anaemia. Her height is 4 ft. 10 ins. and her weight 12 st. Temp. 98.4.

Alimentary System: Her appetite is getting rather impaired. She does not suffer from thirst. after meals she is often troubled with distension relieved by belching of wind. Heartburn and flatulence often trouble her. Her teeth are all artificial, her tongue is somewhat furred but she has no difficulty in swallowing. She vomits at times and her bowels are rather constipated.

Abdomen, Inspection: Abdomen is distended and rather flabby, abdominal movements are poor.

Palpation: No resistance, tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid forms a large rounded tumour projecting downwards for a considerable distance over the chest, the size of a large orange. The skin over the swelling is tightly stretched, thin and adherent to the lower part of the swelling. Over the upper part it is stretched and thrown into folds. The swelling is hard, painless, slightly movable, does not pulsate or fluctuate.

Movement on deglutition is practically nil.

RBC = 4,300,000, WBC = 6450, Hb = 70%, CI = .8,

DC = polymorphous 74%, LL=4%, SL=20%, Eos=2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, dark amber; Sp. Gr. 1025; reaction acid; a large deposit of urates; no other abnormal constituents.

Microscopically: amorphous urates.

Diagnosis: Fibrous goitre.

Prognosis: Owing to the lengthy duration and extensive degenerations in the goitre, medicinal measures will not benefit it. The prognosis is bad.

Treatment: A course of the following treatment was tried but there was no response as was to be expected. Calomel in II gr. doses in tablet form together with gr.X of Thymol in tablet form were given on alternate nights for a fortnight. Then the Calomel was left off and a gr.V tablet of Pot. Iodide in tablet form was given alternately for 4 weeks. The Iodide was then left off for a fortnight and readministered until 3 months treatment had been completed. Whilst her general health improved, the goitre remained as before. All fats, oils and alcohol to be avoided. All potable waters to be boiled.

Name: G.A., age 45, sex male, occupation coal miner.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 10 years.

History, personal: When 35 years of age he was buried in the pit along with some of his companions as the result of a fall of coal. After being extricated he was confined to bed for several weeks owing to the state of his nerves. Only the lower part of his body was buried and it took about 12 hours to extricate him. A year later, while shaving himself, he was struck by a swelling in his neck which he thinks resulted from the shock he received as he never had it before. He believes it commenced on the left side gradually extending to the right side. As a result of this he has had to get increasing sizes in shirts and collars. The swelling in the neck seems to fluctuate in size but never disappears completely. He has no difficulty in swallowing or with his voice. For the last 3 years it has remained stationary in size. As a child he had diphtheria, acute gastro-enteritis as the result of eating pork pies, and influenza in 1918. His surroundings at home are fair and he is regular with his food. When

18 years of age he dislocated the right elbow.

Family: Father died of pneumonia and mother of chronic bronchitis. 2 brothers killed in the war. No sisters. 3 sons alive and well. 2 daughters, both goitrous.

State on Examination: He is of average intelligence, rather introspective, 5 ft. 9 ins. in height and weighs 12 st. There is no jaundice, cyanosis or dropsy. Somewhat anaemic. Temp. 98,4.

Alimentary System: His appetite depends on the state of his nerves but he is not abnormally thirsty. Before, during and after meals he feels quite comfortable at times. At others he has flatulence, waterbrash and heartburn. His lips are of good color. His teeth are very bad, there being several stumps with swollen, retracted gums. There is no difficulty in swallowing. To get relief of his distension after meals he often resorts to vomiting. His bowels like his appetite are variable.

Abdomen, Inspection: Some distension centrally, abdominal wall well developed, abdominal movements poor.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and lymphatic glands are not enlarged. The thyroid shows a marked enlargement, irregular on the surface and more or less horseshoe shaped. Situated on the left lobe are 3 large swellings about the size of a marble over which the skin is stretched, pale and shiny. In the right lobe there is one such swelling. These swellings are not painful, nor adherent to the skin, do not pulsate, but fluctuation is detectable. On auscultation no adventitious sounds are heard.

RBC = 4,375,000, WBC = 7200, Hb = 75%,
CI = .8, DC = polymorphous 75%, SL = 15%,
LL = 5%, Eos = 4%, Basophyls = 1%.

Urinary System: At times pain in the back, rarely in the bladder or urethra.

Urine: color, staw; Sp. Gr. 1015; reaction, acid; deposit of urates. No other abnormal constituents.

Microscopically: amorphous urates.

Circulatory, Nervous and Respiratory Systems:

Nothing to note.

Diagnosis: Fibro cystic goitre.

Prognosis: Owing to the lengthy duration of the disease and the presence of permanent degenerative changes no response is to be expected from medicinal measures. The presence of gastro intestinal disorders also makes the

chances of successful medical treatment still further remote.

Treatment: The aim here is to conserve any functionating thyroid tissue that may still exist and to prevent further infection from the gastro intestinal tract. Accordingly a II.gr. tablet of Calomel is given nightly alternately with gr.X of a Thymol tablet for a fortnight. Then the Calomel is discontinued and V grs. of Pot. Iod. in tablet form is given on alternate nights for 4 weeks. The Iodide tablet is then left off for a fortnight. Treatment is continued for 3 months. In addition the state of the mouth has to be previously remedied by suitable dental treatment. All potable waters to be boiled beforehand, contact with the soil to be avoided, which indicates a change in occupation. All fats, oils and alcohol to be excluded.

Name: Mrs. A.J., aged 42, sex female, occupation housework.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Thick neck.

Duration: 10 years.

History, personal: About 10 years ago she had a difficult labor with her third child and a few weeks later noticed that her neck was getting rather thick in front. She puts this down to straining herself during the confinement as she is sure she did not have it before. As far as she remembers, it is the right side that first drew her attention but as there was no pain, it was of little consequence to her. 7 months later the enlargement had extended to the left side. She was advised to paint the swelling with iodine and thinks the swelling became smaller. 2 years later she again became pregnant and, during this period, the swelling in the neck came back and grew to a much larger size, persisting this time through pregnancy and lactation. She has for many years suffered from "gastric catarrh". Besides this she has had bronchitis and measles.

Family: Father died of old age. Mother died of a "stroke". 2 brothers alive and well. 2 sisters

alive and well. 7 children alive and well.

Her menses commenced at 14 and are usually uneventful.

State on Examination: She is of fair intelligence, her height is 5 ft. 6 ins., her weight is 7 st. There are no developmental errors, no signs of dropsy, cyanosis, or jaundice. Somewhat anaemic. Temp. 98.4.

Alimentary System: Her appetite varies considerably but she has no undue thirst. Some time after eating she feels much distended which is relieved by eructations. Flatulence and heart-burn trouble her considerably. Her lips are of good color, Her teeth are bad, the gums retracted, swollen and show purulent material in several places. There is no dysphagia. At times she vomits to relieve the distension after meals. Her bowels are very constipated for which she takes pills.

Abdomen, Inspection: Abdomen distended around the periphery, the abdominal wall is flaccid, the movements are limited.

Palpation: Flaccid abdominal wall, no tenderness, resistance or fluctuation.

Percussion: Areas of dullness scattered through the abdomen.

Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, glands and

spleen are not enlarged. The thyroid forms a marked enlargement projecting for a considerable distance over the chest. It is irregular in appearance and shows several large areas about the size of a pigeon's egg over which the skin is stretched and glossy. These areas are more numerous on the right side. The skin over the swelling is markedly stretched and thrown into loose folds. There are no dilated veins nor any pulsation detectable. Fluctuation is detectable in the prominent areas but no pulsation. On auscultation no adventitious sounds are heard. The rest of the gland is firm, painless, does not pulsate or fluctuate.

RBC = 4,750,000, WBC = 6700, Hb = 75%, CI = .7, DC = polymorphous 63%, LL = 4%, SL = 32%, Eos = 1%.

Nervous, Respiratory and Circulatory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction, acid; Sp. Gr. 1010; flakes of mucus floating about; a deposit of mucus. No other abnormal constituents. Microscopically: catarrhal cells; no organisms detectable.

Diagnosis: Fibro-cystic goitre.

Prognosis: Owing to the long duration and the permanent changes in the gland, it has reached a stage from which recovery is impossible. The prognosis as regards life is good but as regards the goitre, bad.

Treatment: Aims at the conservation of any thyroid tissue that may still functionate. This is commenced by correcting the septic state of the mouth by suitable dental treatment, and the correction of the defective action of the bowels by the administration of gr.II of Calomel, in tablet form, together with gr.X of tab. Thymol nightly for a fortnight. Then the Calomel is left off and a V gr. tablet of Pot. Iodide is given on alternate nights for 4 weeks. The Iodide tablet is then left off for a fortnight until 3 months of the treatment is completed. All potable waters to be boiled, and fats, oils and alcohol to be excluded. Whilst the general health improved, there was no effect on the goitre.

Name: Miss E.S., age 20, sex female, occupation draper's assistant.

Place of Birth: Carlisle. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 8 months.

History, personal: She came to this neighbourhood towards the end of last year when she was quite well. In February last she suffered from influenza from which she recovered satisfactorily. Whether the lump was present in her neck then she does not know as it was discovered accidentally whilst washing herself. As the swelling was small and painless she trusted to its natural disappearance. Instead it grew bigger extending to the other side and now forms a fair sized goitre. She lives in apartments under fair surroundings and is regular with her meals. She has had mumps, chicken pox and measles as a child. No accidents.

Family: Father alive and well. Mother alive and well No sisters. 1 brother alive and well.

Her menses commenced at 14 and are quite regular.

State on Examination: She is of fair intelligence, is nearly 5 ft. in height and weighs 7 st. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp.98.4.

Alimentary System: Her appetite is fair. She does not suffer from thirst, feels comfortable before, during and after meals. Rarely suffers from heartburn or flatulence. Her teeth are in good condition. Her tongue is fairly clean. She has no dysphagia, rarely vomits and has a motion once daily.

Abdomen, Inspection: Slight general prominence, no retraction, abdominal wall well developed, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. In the situation of the thyroid there is a horseshoe shaped swelling, extending from the thyroid region to well above the clavicles, which follows the movements of deglutition and presents the characteristic flatness on side view. The skin over the swelling is not adherent, there are a few dilated veins visible and slight pulsation in the neck. The swelling is smooth, painless, soft, does not fluctuate nor pulsate. On auscultation a haemic murmur is audible in the neck.

RBC = 3,500,000, WBC = 5900, Hb = 60%, CI = .8, DC = polymorph. 60%, SL = 26%, LL = 13%, Eos = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: At present there is pain in the back not related to menstruation, no pain in the bladder or urethra.

Urine: color, dark amber; Sp.Gr., 1025; reaction acid; deposit of urates; no other abnormal constituents.

Microscopically: Amorphous urates.

Diagnosos: Parenchymatous goitre.

Prognosis: The goitre is of short duration but as she appears to be susceptible to the disease treatment must be continued throughout her residence here. Should she leave the district the goitre will probably disappear spontaneously.

Treatment. Calomel gr.II is taken nightly for a fortnight. Then gr.X of Thymol and gr.½ of Thyroid extract is taken each in tablet form alternatively each night for 3 weeks. The extract is taken twice weekly and then once weekly being discontinued for 1 week. The treatment is to be continued for 3 months. A change in residence is very desirable. All fats, oils and alcohol to be avoided during the Thymol administration and all potable waters to be previously boiled.

Name: I.H., sex male, age 13, occupation at school.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 6 months.

History, personal: The present trouble commenced six months ago although he was not ailing of anything at the time when he became aware of an unusual swelling in his neck but his mother did not think it was anything serious and painted it with iodine. The swelling, his mother states, varies in size but does not seem to cause him any trouble whatever. The surroundings at home are fair and he is regular with his meals. The only disease of childhood was whooping cough. No accidents.

Family: Father alive and well. Mother alive and well. 3 brothers alive and well. 4 sisters alive and well.

State on Examination: He is of fair intelligence, stands nearly 4 ft. in height and weighs about 5 st. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: He takes his food well and does not suffer from thirst. Before during and after meals he is quite comfortable. His teeth

are good, his tongue clean, there is no difficulty in swallowing, rarely vomits and has a motion once daily.

Abdomen, Inspection: Slight prominence below the umbilicus and slight retraction above it. Abdominal wall well developed. Movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Respiratory, Circulatory and Nervous Systems:

Nothing to note.

Haemopoietic System: The spleen, lymphatics and lymphatic glands are not enlarged. In the situation of the thyroid gland is a well marked swelling, more prominent on the left side and horseshoe shaped. It extends from the thyroid regions to above the clavicles. The characteristic flatness is well seen. The skin over the swelling is not adherent. There are a few dilated veins and slight pulsation is detectable. On palpation the swelling is soft, painless, non pulsatile, non fluctuating. On auscultation a haemic murmur is heard in the neck.

RBC = 4,234,000, WBC = 6800, Hb = 70%, CI = .8, DC = polymorphous 61%, SL = 20%, LL = 16%, Eosin = 3%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction, acid; Sp.Gr.1010; a deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells and a few rod shaped organisms.

Diagnosis: Parenchymatous goitre.

Prognosis: As there is no family history of goitre and the disease is of short duration it will yield under medicinal measures. A relapse may take place at a later date.

Treatment: Calomel gr.I is taken nightly for a fortnight. Then gr.V of Thymol is taken nightly and a teaspoonful of Syrupus Ferri Iodide thrice daily for 3 weeks when the syrup is taken once a day and then left off for one week. The treatment continues for 3 months. Then a teaspoonful of the syrup is taken once in 3 months, once in 6 months and so on. A change in residence is very desirable. All fats, oils and alcohol to be avoided and all potable waters to be previously boiled.

Name: Mrs. J.L., age 26, sex female, occupation housework.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 4 years.

History, personal: The swelling in the neck was pointed out to her by her mother who herself has an old standing goitre, she being the second in the family to develop the disease. It was painted with iodine and she thinks it did the swelling good. The disfigurement is the only complaint. She lives under fair surroundings, takes her food regularly and has had no accidents. As a child she suffered from measles followed by broncho-pneumonia.

Family: Father killed in the war. Mother alive with an old standing goitre 1 sister has a goitre. No brothers.

Her memses commenced at 16 and are regular. No children yet.

State on Examination: She is of fair intelligence, stands 4 ft. 7 ins. in height and weighs 6 st. 2 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy, but slight anaemia. Temp. 98.4.

Alimentary System: Her appetite is fair. She suffers

no undue thirst, feels comfortable before, during and after meals. Her teeth are all false, her tongue is clean, there is no difficulty in swallowing, no vomiting and has a motion daily.

Abdomen, Inspection: Slight prominence with central retraction, abdominal wall firm, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid presents a fair sized enlargement more or less irregular in shape, owing to three ~~nended~~ Prominent areas on its surface. Two are situated in the right lobe and one in the left, and over these areas the skin is shiny, pale and thin. They cannot be moved apart from the rest of the gland which is also enlarged. The whole mass moves fairly well with deglutition There are no dilated veins visible nor any pulsation detectable. On palpation the swelling does not pulsate nor is any fluctuation detectable.

RBC = 5,250,000, WBC = 7000, Hb = 85%,
CI = .8, DC = polymorphous 70%, SL = 25%,
LL = 3%, Eos = 2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; Sp. Gr. 1020; reaction, acid; a deposit of mucus; no other abnormal constituents.

Microscopically: catarrhal cells and a few rod shaped organisms.

Diagnosis: Fibro-cystic goitre.

Prognosis: As regards the alleviation of the goitrous condition by medicinal measures, it is bad as permanent degenerative changes have taken place.

Treatment: The aim is to conserve any thyroid tissue that may still be functionating. Calomel gr.II and Thymol gr.X, each in tablet form, are taken nightly for a fortnight. The Calomel is then left off and gr.V of Pot. Iodide in tablet form is taken together with the Thymol alternately, nightly, for 4 weeks. The Iodide is then discontinued for a fortnight. Treatment is to be continued for 3 months. Although the general health improved considerably, the goitre was unaffected. All fats, oils and alcohol to be avoided during the Thymol administration, and all potable waters to be previously boiled.

Name: D.J., age 14, sex male, occupation at school.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 5 months.

History, personal: During the early part of May of this year he had an attack of acute tonsillitis when it was observed that a swelling of the thyroid was present as well. Although his mother admitted she had seen it, there being no inconvenience caused by it, she did not trouble to get it attended to. It has not caused him any difficulty in swallowing or with his breathing. Previous illnesses were mumps and bronchitis. No accidents. He lives under fair surroundings and takes his food regularly.

Family: Father alive and well. Mother alive and well. No brothers or sisters.

State on Examination: He is of fair intelligence, stands 4 ft. 2 ins in height and weighs about 5 st. There is no jaundice, cyanosis or dropsy Somewhat anaemic. Temp. 98.4.

Alimentary System: His appetite is good and he does not suffer from thirst. Before, during and after meals he feels quite comfortable. His lips are of good color, his teeth are good

and there is no dysphagia.

Abdomen, Inspection: No prominence, slight general retraction, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Nervous, Respiratory and Circulatory Systems:

Nothing to note.

Haemopoietic System: The spleen is not enlarged.

The tonsillar lymphatic glands are palpable.

The thyroid presents a fair enlargement, more prominent on the right side, and horseshoe in shape. The characteristic flatness is well brought out on side view. The skin over the swelling is not adherent and there are a few dilated veins visible but no pulsation. On palpation the swelling is soft, painless, smooth, does not pulsate or fluctuate. On auscultation a haemic murmur is audible in the neck.

RBC = 3,850,000, WBC = 8500, Hb = 60%,

CI = .7, DC = polymorphous 73%, LL = 4%,

SL = 22%, Eos = 1%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, cloudy straw; reaction, acid; Sp. Gr. 1012; a large deposit of mucus. No

other abnormal constituents.

Microscopically: catarrhal cells in large numbers but no organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: As there is no family history of goitre and the disease is of short duration, it will respond to medicinal measures. A relapse at a later date may possibly result.

Treatment: Is directed in the first instance to the removal of the infected tonsils and adenoids associated. Then Calomel gr.I is taken nightly for a fortnight. Thymol gr.V is then taken once nightly and a teaspoonful of Syrupus Ferri Iodidi twice daily for 3 weeks, when the Syrup is taken once daily and then left off for a week. The treatment is to be continued for 3 months, then once in 6 months and so on. A change in residence is very desirable. All fats, oils and alcohol to be avoided during the Thymol administration. All Potable waters to be previously boiled.

Name: M.B., age 23, sex male, occupation farm labourer.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Growth in the neck.

Duration: 4 years.

History, personal: When 19 years of age he contracted typhoid fever which necessitated confinement to bed for over 12 weeks owing to severe haemorrhage during this illness.

During his convalescence he accidentally discovered a swelling in his neck which he thought was due to enteric fever. On going to the Lake district for convalescence the swelling disappeared but 3 months residence here caused its return. Apart from the enlargement there are no other symptoms. As a child he had measles. He lives under good surroundings, takes his meals regularly and has had no accidents.

Family: Father alive and well. Mother alive with an old standing goitre. 2 sisters, both goitrous. No brothers.

State on Examination: Intelligence is fair. He is 5 ft. 9 ins. in height and weighs 10 st. There are no developmental errors, no signs of jaundice, dropsy, cyanosis or anaemia.

Temp. 98.4.

Alimentary System: His appetite is good and he does not suffer from thirst. Before, during and after meals he feels comfortable. His teeth are good, his tongue is clean, there is no difficulty in swallowing, rarely vomits and has one motion daily.

Abdomen, Inspection: Slight general prominence, abdominal wall well developed, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: The spleen is palpable, the lymphatic glands are not enlarged. The thyroid gland presents a fair sized swelling more or less horseshoe in shape and more prominent on the right side. It extends from the thyroid region to well above the clavicles, moves fairly well with deglutition. There are a considerable number of dilated veins visible in the neck and also pulsation. The skin over the swelling is not adherent. On palpation the swelling is firm, painless, does not pulsate or fluctuate. On auscultation a haemic murmur is audible in the neck.

RBC = 5,300,000, WBC = 6700, Hb = 90%,

CI = .9, DC - polymorphous 74%, LL = 7%,

SL = 17%, Eosin = 2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; Sp. Gr. 1020; reaction, acid; a large deposit of mucus; no other abnormal constituents.

Microscopically: large numbers of catarrhal cells; no organisms detectable.

Diagnosis: Fibrous goitre.

Prognosis: Owing to the family history of goitre and its lengthy duration no benefit will result from medicinal measures. The prognosis is consequently bad.

Treatment: As no signs of myxedema have appeared there is obviously some thyroid tissue still functionating. The treatment therefore aims at conserving such tissue as far as possible. A II gr. Calomel tablet is given nightly alternately with gr.X of a Thymol tablet for a fortnight. Then the Calomel is left off and a V gr. tablet of Pot. Iodide is given on alternate nights for 4 weeks. The Iodide tablet is then left off for a fortnight, then given alternately and so on. Treatment is to be continued for 3 months as a minimum. All

potable waters are to be boiled previously and infection from the soil is to be avoided by scrupulous cleanliness before partaking of any meal. All fats, oils and alcohol to be avoided during the Thymol medication. A change in residence and in occupation is very desirable.

Name: A.P., age 11, sex male, occupation at school.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Growth in the neck.

Duration: 15 months.

History, personal: When 9 years he contracted diphtheria from his sister which necessitated tracheotomy. The child had been very ill for about 5 days when it began to complain of difficutly in breathing. This became worse and by the time medical aid arrived it was quite blue all over and the tracheotomy had to be done in a hurry. All went well afterwards, the wound healing. As she was always anxious about the scar she tended it carefully until she thought his neck was getting rather thick, gradually increasing until a distinct swelling about the size of a marble was visible situated just below the lower end of the scar. The boy did not complain of it and she painted it with iodine with no effect. Besides diphtheria, he has had measles and chicken pox. He is regular in taking his food and lives under favourable conditions. Never any accidents.

Family: Father alive and well. Mother alive and well. 3 brothers alive and well. 4 sisters alive and well.

State on Examination: The boy is of fair intelligence, stands 3 ft 5 ins. in height and weighs 5 st. There are no developmental errors, no signs of jaundice, cyanosis, dropsy and anaemia.
Temp. 98.4.

Alimentary System: Appetite fair, no abnormal thirst. Feels comfortable before during and after meals. Troubled at times with heartburn. Teeth are good, tongue is clean and there is no difficulty in swallowing. His bowels are regular.

Haemopoietic System: The spleen, lymphatics and lymphatic glands are not enlarged. Situated in the isthmus of the thyroid gland is an oval swelling about the size of a pigeon's egg over which the skin is tightly stretched, pale and thin. The swelling follows the movements of deglutition. The rest of the thyroid is also enlarged. On palpation no fluctuation is detectable, no pulsation, nor any pain.
RBC = 4,250,000, WBC = 7500, Hb = 80%, CI = .9, DC = polymorphous 60, SL = 24, LL = 12, Eos = 3, Basoph. = 1.

Urinary System: No pain in the back, bladder or urethra.
Urine: color, light straw; reaction, acid; S.Gr.1012; a deposit of mucus. No other

abnormal constituents.

Microscopically: catarrhal cells. No organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: As there is no family history of goitre and the duration of the disease is short it will respond to medical measures. There is, however, the possibility of its return at a later date.

Treatment: Calomel gr.I in tablet form is administered nightly for a fortnight. Then gr.V of Thymol in tablet form is given each night and a teaspoonful of Syrupus Ferri Iodidi thrice daily for 3 weeks. Then the Syrup is taken once daily and then left off for a week. Treatment is carried out for 3 months. Then a teaspoonful of the Syrup is taken once in 3 months, then once in 6 months and so on. A change in residence is very desirable. All fats, oils and alcohol to be avoided during the Thymol medication. All potable waters to be previously boiled.

Name: V.F., age 14, sex female, single, occupation housework.

Place of Birth: Ferry Hill. Place of Residence: Chilton.

Complaint: Swelling in the neck.

Duration: 9 months.

History, personal: 3 years ago whilst doing her hair she became aware of a swelling in the front of her neck. She did not take any notice of it at that time as it was quite small. She felt no pain in it and it caused her no trouble whatever. On the advice of her mother she painted it with iodine which caused the swelling to become much smaller. The following year she noticed her neck was again getting bigger but attributed it to the putting on of flesh. The swelling gradually became bigger until it became quite prominent but disappeared whilst she was on holiday although she did not paint it with iodine. During January of this year it again became prominent and she decided to seek treatment. As a child she had measles and during the influenza epidemic, infuenza. Otherwise she is very healthy. No accidents. Her surroundings at home are fairly good and she takes her food regularly.

Family: Father alive and well. Mother alive, has an old goitre. 1 sister had a goitre which disappeared on leaving the district.

1 brother, aged 5, is goitre free.

State on Examination: She is an intelligent girl and gives a good account of herself. There are no developmental errors, no signs of jaundice, dropsy or cyanosis. Her height is 4 ft. 6 ins. and her weight 7 st. Her mucus membranes are distinctly anaemic. Temp. 98.4.

Alimentary System: Her appetite is good and she is not thirsty. Before and after meals she has no discomfort. Her lips are healthy, her teeth are good, her tongue clean, no difficulty in swallowing and never vomits. Her bowels are very constipated for which she takes cascara.

Abdomen, Inspection: Somewhat distended all over, abdominal musculature good and abdominal movements fair.

Palpation: No tenderness, resistance or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: On inspection in the situation of the Thyroid gland there is a horseshoe shaped swelling, more prominent on the right side. It appears smooth with a distinct

flatness on side view. The skin over the swelling is freely movable, there are a few dilated veins and slight pulsation in the neck. The swelling follows the movements of deglutition. On palpation the shape of the swelling is confirmed, the tumour is smooth, painless, does not pulsate and no fluctuation is detectable. On auscultation no adventitious sounds are audible. The spleen, lymphatics and lymphatic glands are not enlarged.

RBC = 4,300, 000, WBC = 6000, Hb = 80%,

CI = .9, DC = polymorphous 65% SL = 24%

LL = 4% Eos = 6% Baso = 1%

Circulatory, Respiratory and Nervous Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, cloudy; Sp. Gr. 1030; reaction, acid; cloud-like deposit of mucus; no other abnormal constituents.

Microscopically: catarrhal cells scattered throughout the field; no organisms visible.

Diagnosis: Parenchymatous goitre.

Prognosis: The goitre is of a kind which readily responds to treatment and, being of comparatively short duration, without any degenerative changes having yet taken place; the

prognosis is good. On the other hand as there is a family history of goitre there is probably a hereditary instability of the thyroid which may possibly cause a relapse.

Treatment: Is commenced by ensuring an efficient action of the bowels by the use of a II gr. tablet of Calomel every night for a fortnight. Then further disinfection of the bowels is proceeded with by the use of gr.V of Thymol in tablet form alternately each night with gr.½ of Thyroid extract in tablet form. This is continued for 3 weeks, then the Thyroid extract is taken twice weekly, next once weekly and a week's rest from the ~~Thymol~~ THYROID treatment is allowed. This is then resumed, the treatment lasting for 3 months. All potable waters to be boiled previously. All fats and oils to be avoided. A change of residence would prevent a relapse.

Name: A.D., age 21, sex male, occupation engineer.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 8 months.

History, personal: The swelling in his neck was discovered accidentally 8 months ago whilst dressing himself. It was merely a fullness at the time but he could feel it quite well and noticed it moved up and down when he swallowed. This alarmed him as he thought there was something wrong with his food passage. Never any difficulty in swallowing or with his breathing. He lives under fair surroundings, is regular with his meals, never any accidents. Last February he had influenza and, as a child, scarlet fever and a running ear.

Family: Father alive and well. Mother had an old standing goitre and died during influenza epidemic in 1918. 3 sisters - 2 goitrous. 1 brother alive and well.

State on Examination: He is of fair intelligence, is 5 ft. 6 ins. in height and weighs 9 st. 5 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia.

Temp. 98.4.

Alimentary System: His appetite is good, he is not

abnormally thirsty, feels comfortable before, during and after meals. His teeth are in good order, his tongue is clean, no dysphagia, never vomits and has a motion once daily.

Abdomen, Inspection: Slight general fullness, no retraction, abdominal wall well developed and movements good.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatic glands and lymphatics are not enlarged. The thyroid presents a definite horseshoe shaped swelling more prominent on the right side and shows the characteristic flatness well. It is not adherent to the skin, and follows the movements of deglutition. On palpation it is soft, smooth, painless, non pulsatile, non fluctuating. On auscultation a haemic murmur is audible.

RBC = 5,490,000, WBC = 7000, Hb = 95%,

CI = .9, DC = polymorphous 80%, LL = 5%,

SL = 13%, Eosin = 2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in his back, urethra or bladder.

Urine: color, straw; S.Gr. 1012; reaction, acid; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells, and ~~grave~~ gram negative rod shaped organisms.

Diagnosis: Parenchymatous goitre.

Prognosis: Owing to the family predisposition to goitre the prognosis must vary considerably. The disease has made its appearance comparatively late and is yet in an early stage. If treatment is carried out persistently the outlook is fair but a relapse may at any time take place. Should he change his residence for a goitre free area the prognosis would thereby be improved.

Treatment: For the first fortnight gr.II of Calomel is administered at night. Then Thymol tablets gr.X in tablet form alternating with Thyroid extract gr. ½ in tablet form every night for 3 weeks. The ~~Thymol~~ THYROID tablet is then taken only twice weekly and then once weekly with 1 week interval in the Thyroid extract administration. Treatment to be carried out for 3 months. All fats, oils and alcohol to be avoided during the Thymol medication and all potable waters to be ~~avoided~~ BOILED. Owing to the family history of goitre gr.V of Pot.Iodide in Tablet form is

taken once in 3 months then once in 6 months and so on. A change in residence is very desirable.

Name: A.W., age 22, sex male, occupation bootmaker.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 14 months.

History, personal: The swelling in the neck came on shortly after catching cold during the early part of last year. Owing to a sore throat he rubbed his neck with camphorated oil and thought he felt a lump in his neck. This caused him much alarm as his mother had died of cancer of the throat. He made haste to find out what it was. He firmly maintains that the swelling was discovered accidentally. Never any feeling of fullness in the neck, nor any difficulty with deglutition, phonation or respiration. He lives under fair surroundings, takes his meals regularly and has not had any accidents. As a child he had tonsilitis, otitis media and scarlet.

Family: Father alive and well. Mother was goitrous and died of "cancer of the throat". 3 sisters, 2 who had a goitre but left the district. 4 brothers all alive and well.

State on Examination: He is of fair intelligence, is 5 ft. 3 ins. in height and weighs 10 st. There are no developmental errors, no signs of jaundice, cyanosis or dropsy. Somewhat

anaemic. Temp. 98.4.

Alimentary System: His appetite is good and he does not suffer from thirst. He feels comfortable before, during and after meals, and is rarely troubled with heartburn, waterbrash or flatulence. His teeth are good, his tongue is clean and there is no difficulty in swallowing. Rarely vomits and has a motion daily.

Abdomen, Inspection: No prominence or retraction, abdominal wall well developed, movements fair. Palpation: No tenderness, resistance or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. In the situation of the thyroid gland is a fair sized swelling, horseshoe shaped, extending from the thyroid region to well above the clavicles. The characteristic flatness is well marked. There are a considerable number of dilated veins as also pulsation visible in the neck. The swelling follows the movements of deglutition. On palpation it is smooth, larger on the right side, painless, non fluctuating or pulsatile and not adherent to the surrounding structures. On auscultation a haemic murmur

is audible in the neck.

RBC = 5,000,000, WBC = 6900, Hb = 85,

CI = .8, DC = polymorphous 62% SL% = 23%

LL = 10% Eosin = 4% Basophyls = 1%

Nervous, Circulatory, and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, straw; reaction, acid; Sp. Gr. 1015; a large deposit of mucus. No other abnormal constituents.

Microscopically: large numbers of catarrhal cells and a few rod shaped organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: Owing to the liability to develop goitre in the family the prognosis depends largely on the constantcy with which he carries out treatment. Should he leave the goitrous area the prognosis would be better.

Treatment: Calomel gr.II in tablet form is taken nightly for a fortnight. Then gr.X of Thymol and gr.½ of Thyroid extract in tablet form are taken alternately each night for 3 weeks. The extract is then taken twice a week for 1 week, then once weekly and discontinued for another week. The treatment to be continued

for 3 months. A change of residence is very desirable and regular exercise in the open must be taken daily. Gr.V of Pot. Iodide should be taken once in 3 months, once in 6 months and so on. All fats, oils and alcohol to be avoided during the Thymol medication and all potable waters to be previously boiled.

Name: W.M., age 10, sex male, occupation at school.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 2 years.

History; personal: For the last 12 months the mother noticed that he was continually wriggling about with his collar complaining that it was too tight for his neck, and, while altering its diameter made it suitable for some time, the old trouble returned. She states that it was not the shirt that was shrinking, because there were times after it had been too tight when it would be too big for him for quite some months. Then it would get too small again which happened twice. The boy has been a martyr to what she calls "growing pains" which in her opinion have made him outgrow his strength. She believes the swelling first made its appearance in the left side of the neck but was not present at birth. As a child he had appendicitis, infantile diarrhœa and bronchitis. He is regular in taking his meals and lives under favourable surroundings. Never any accidents.

Family: Father alive and well. Mother alive and

well. No brothers or sisters.

State on Examination: The boy is characterised by an amount of intelligence characteristic of an only child. He is 3 ft. 9 ins. in height and weighs 5 st. There are no developmental errors, no signs of jaundice, dropsy or cyanosis. Some anaemia is present. Temp.98.4.

Alimentary System: His appetite depends on his moods but he does not suffer from thirst, feels comfortable before, during and after meals. His lips are of good color, his tongue is somewhat furred, his teeth are good, there is no difficulty in swallowing or with his bowels.

Abdomen, Inspection: The abdomen is somewhat retracted, no flaccidity, the movements are good.

Palpation: Slight general resistance, no tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Circulatory, Respiratory and Nervous Systems: Nothing to note.

Haemopoietic System: The spleen, lymphatics and lymphatic glands are not enlarged. Situated in the position of the thyroid gland is a horsehoe shaped swelling which follows the movements of deglutition. Looking sideways the characteristic flatness is well

demonstrated. The skin over the swelling is not adherent, there are a few dilated veins and slight pulsation is detectable. The swelling is larger on the left side. On palpation it is painless, non pulsatile or fluctuating and not adherent to the surrounding structures. On auscultation a haemic murmur is audible in the neck.

Urinary System: At times pain in the back, never in bladder or urethra.

Urine: color, cloudy straw; reaction, acid; Sp. Gr. 1010; flakes of mucus floating about and a deposit of mucus. No other abnormal constituents.

Microscopically: large numbers of catarrhal cells; no organisms detectable.

Diagnosis: Colloid goitre.

Prognosis: As there is no family history of goitre and the duration of the disease is comparatively short it will probably yield to medicinal measures. A relapse in later life may occur.

Treatment: Is commenced with I grain of Calomel in tablet form nightly for 14 days. Then gr.V of Thymol in tablet form each night and a teaspoonful of Syrupus Ferri Iodidi thrice daily for 3 weeks when the syrup is taken

once daily and left off for a week. Treatment to be carried out for 3 months. Then a teaspoonful of the syrup is taken once in 3 months, then once in 6 months and so on. During the Thymol administration all fats, oils and alcohol to be avoided, and all potable waters to be boiled. A change in residence is very desirable.

Name: B.W., age 23, sex male, occupation electrician.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 2 years.

History, personal: The swelling in his neck was pointed out to him by his sister who herself is goitrous and he likewise painted the swelling with iodine which caused it to become somewhat smaller but it did not disappear altogether. He then left off painting his neck and believes the swelling commenced to increase in size. On resuming the iodine painting there was no effect on the lump in his neck. He lives under fair surroundings, is regular in taking his meals and has had no accidents. As a child he had mumps and whooping cough.

Family: Father killed in a railway accident. Mother has an old standing goitre. 2 sisters, 1 of whom is goitrous. No brothers.

State on Examination: He is of fair intelligence, stands 5 ft. 2 ins. in height and weighs 9 st. 12 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: He has always had a good

appetite and is not abnormally thirsty. There is no discomfort after meals, occasionally heartburn however, rarely flatulence. His teeth are good, his tongue clean, there is no dysphagia, rarely vomits and has one motion daily.

Abdomen, Inspection: Somewhat prominent below the umbilicus and retracted above it. Abdominal wall well developed, movements fair.

Palpation: No resistance, tenderness, or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and lymphatic glands are not enlarged. The thyroid forms a well marked horseshoe shaped swelling extending from the thyroid region to above the clavicles about equally prominent on both sides and follows the movements of deglutition. The swelling is not adherent to the skin and is covered by several dilated veins whilst pulsation is also visible in the neck. On palpation the swelling is firm, painless, non pulsatile and does not fluctuate. On auscultation a haemic murmur is audible in the neck.

RBC = 5,250,000, WBC = 6700, Hb = 95%,
CI = .9, DC = polymorphous 64%, LL = 8%,
SL = 24%, Eosin = 2%, Baso = 2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, straw; Sp. Gr. 1010; reaction, acid; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells; no organisms detectable.

Diagnosis: Colloid goitre.

Prognosis: In this case there is an hereditary instability of the thyroid gland which predisposes him to goitre. There is consequently the necessity of avoiding a goitrous area and to persist in treatment. Otherwise a relapse is bound to occur. As the disease has developed fairly late the prognosis is moderately good.

Treatment: Calomel gr.II in tablet form is taken nightly for a fortnight. Then gr.X of Thymol and gr.½ of Thyroid extract each in tablet form are taken alternately each night for 3 weeks. The extract is now taken twice weekly, then once weekly and discontinued for a week. The treatment is continued for 3 months. A change of residence is very desirable and gr.V of Pot. Iodide in tablet form should be

taken once in 3 months, then once in 6 months and so on. All fats, oils and alcohol to be avoided during the Thymol medication and all potable waters to be previously boiled.

Name: J.A., age 16, sex male, occupation at school.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 6 months.

History, personal: He was not aware on anything amiss with himself until the school medical officer told him he had goitre and should get it treated. As his mother and sister both are goitrous he thought it was one of the family peculiarities and, like her, painted the swelling with iodine. The mother does not remember seeing it before but as it never was very prominent she may have overlooked it. As a child he had scarlet fever, whooping cough and broncho-pneumonia. He takes his food regularly and lives under pleasant surroundings. No accidents.

Family: Father alive and well. Mother has had a goitre for 20 years. 1 sister aged 15 is goitrous. 3 brothers alive and well.

State on Examination: He is of fair intelligence and gives a fair account of himself. Stands 4 ft. 10 ins. in height and wighs 7 st. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: His appetite is good and does not suffer from thirst, feels quite comfortable before, during and after meals, not troubled by flatulence, heartburn or waterbrash. His lips are of good color, his teeth are good, there is no difficulty in swallowing, rarely vomits and has a motion daily.

Abdomen, Inspection: No prominence, slight general retraction, abdominal wall well developed, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. The Thyroid presents an enlargement not very conspicuous unless the head is thrown back. It is more prominent on the right side, horseshoe in shape and follows the movements of deglutition. The characteristic flatness is well seen on side view. There are a few dilated veins and slight pulsation detectable in the neck. On palpation the swelling is soft, painless, not adherent to the surroundings, does not pulsate and no fluctuation is detectable. On auscultation no adventitious sounds are audible.

RBC = 4,900,000, WBC = 6750, Hb = 85%,

CI = .8, DC = polymorphous 60%, LL = 15%,

SL = 20%, Eosin = 5%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; Sp. Gr. 1017; reaction, acid; no deposit and no abnormal constituents.

Microscopically: an occasional catarrhal cell; no organisms are visible.

Diagnosis: Parenchymatous goitre.

Prognosis: As he is born of goitrous parents he probably has a congenital instability of the thyroid gland which predisposes him to the disease. As the disease is of short duration it will yield to medicinal measures, but treatment must be persisted with otherwise a relapse is certain.

Treatment: Calomel gr.II is administered each night for a fortnight. Then gr.X of Thymol and gr.½ of Thyroid extract each in tablet form are taken alternately each night for 3 weeks. The extract is then taken twice weekly, then once weekly being discontinued for a week. The treatment is continued for 3 months. A change of residence is very desirable. Gr.V of Pot. Iodide is to be taken once in 3

months, then once in 6 months and so on. All fats, oils and alcohol to be avoided during the Thymol medication, and all potable waters to be previously boiled.

Name: Miss A.A., age 15, sex female, occupation shop assistant.

Place of Birth: Swansea, Wales. Place of Residence: Windlestone.

Complaint: Thick neck.

Duration: 9 months, off and on.

History, personal: In February of last year she had a bad attack of influenza with a severe relapse on getting up too soon. She was very weak for about 6 weeks afterwards and lost a considerable amount of flesh. It was then that her mother drew her attention to a lump in her neck. As far as she can remember it appeared to be on the right side chiefly but as it grew in size extended to the left side as well. She was advised to paint the swelling with iodine but does not think it had much effect. Apart from its unsightliness it causes her no trouble. She lives under fair surroundings, has had no accidents, takes her food regularly and as a child suffered from German measles.

Family: Father alive and well. Mother alive and well. 1 sister alive and well. 3 brothers alive and well.

Her menses have just begun and appear to be regular.

State on Examination: She is an intelligent girl of the highly strung type. Stands 4 ft. 2 ins.

in height and weighs 6 st. 4 lbs. There are no developmental errors, no signs of jaundice, cyanosis. Anaemia is marked. Temp. 98.4.

Alimentary System: She takes her food well at present, does not suffer from thirst, before during and after meals she is at times troubled with flatulence and heartburn. Her teeth are defective in places. She has no dysphagia, occasionally vomits and her bowels vary in their mode of action.

Abdomen, Inspection: No prominence, somewhat retracted generally, poor abdominal wall. Movements fair.

Palpation: No tenderness, slight general resistance, no fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid presents a uniform enlargement which follows the movements of deglutition and shows the characteristic flatness well on side view. The swelling is smooth, painless, soft, does not pulsate or fluctuate. A few veins are seen coursing over the surface and slight pulsation is detectable in the neck. On auscultation a haemic murmur is audible in the neck.

RBC = 3,750,000, WBC = 5800, Hb = 60%,

CI = .8, DC = polymorphs 58%, LL = 15%,

SL = 24%, Eosin = 2%, Basoph = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, light amber; reaction, acid; S.Gr. 1010; large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells in large numbers. No organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: This is obviously a type of goitre which has resulted from the so-called physiological hypertrophy at puberty. It is also of a type which yields well to medicinal measures. The outlook consequently is good.

Treatment: The septic state of the mouth received suitable dental treatment. Calomel gr.I was then taken nightly for a fortnight. Thymol gr.V in tablet form and Thyroid extract gr.½ also in tablet form were then given alternately every night for 3 weeks. The Thyroid extract was then taken twice weekly for 1 week, then once weekly for 1 week and discontinued a week. The treatment is carried out for 3 months. A teaspoonful of Syrupus Ferri Iodidi is then

taken once in 3 months, then once in 6 months and so on. During the Thymol administration all fats, oils and alcohol to be avoided and all potable waters to be previously boiled.

Name: Miss L.B., age 22, sex female, occupation dressmaker.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Loss of appetite, vomiting, constipation and goitre.

Duration: 6 months.

History, personal: Her present trouble she believes is the result of being too much occupied with her occupation and not finding sufficient time to look after herself. She has to take her meals when she can get them, and the same applies to the calls of nature. As a result she has lost her appetite and is very constipated. To add to her troubles the goitre made its appearance 6 months ago. She also suffers from cold hands and feet and feels life quite a burden. She lives under fair surroundings at home and at work and has not sustained any accidents. In childhood she had impetigo, measles followed by broncho pneumonia.

Family: Father alive and well. Mother alive and well. 2 brothers alive and well. 4 sisters alive and well.

Her menses started at 15, causes her much pain and she is anaemic.

State on Examination: She is of fair intelligence,

5 ft. 3 ins. in height and weighs 6 st. 2 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy. Anaemia is marked. Temp. 98.4.

Alimentary System: Her appetite is fair at times, she does not suffer from thirst. After meals she is ~~never~~ troubled by flatulence, which often leads to vomiting. Heart burn and water brash give her much trouble as well. Her teeth are good in places, in others decayed or missing. Her tongue is furred. There is no dysphagia.

Abdomen, Inspection: Marked general distension, no retraction, abdominal wall flaccid, movements fair.

Palpation: Tenderness over appendicular region, the splenic flexure and the descending colon. Resistance in these areas. No fluctuation.

Percussion: Marked tympanitic note all over.

Auscultation: Borborygmi.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. The thyroid forms a fair sized swelling extending from the thyroid regions to a finger's breadth above the clavicles. The swelling follows the movements of deglutition, is not adherent to the surrounding structures, shows the characteristic

flatness on side view. There are a few dilated veins coursing over its surface and slight pulsation is visible in the neck. On palpation the swelling is soft, painless, does not pulsate or fluctuate.

RBC = 4,350,000, WBC = 6750, Hb = 75%,

CI = .8, DC = polymorpheus 64%, LL = 7%,

SL = 25%, Eosin = 3%, Basophyls = 1%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; reaction, acid; S.Grav. 1020; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells in large numbers. No organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: Provided the oral sepsis and the gastro intestinal trouble is remedied the prognosis as regards the goitrous condition is fair.

Treatment: The septic mouth in the first place received suitable dental treatment. Calomel gr.II are taken every night for a fortnight. Then gr.X of Thymol and gr.½ of Thyroid extract each in tablet form are taken alternately every night for 3 weeks. The extract is then taken twice a week for 1 week, then once a week and then discontinued for a week. The treatment is

carried out for 3 months. All fats, oils and alcohol to be avoided during the Thymol treatment. All potable waters to be previously boiled. A change in residence and occupation is very desirable.

Name: Miss A., age 18, sex female, occupation pupil teacher.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 2 years.

History; personal: About 2 years ago whilst studying for an examination she became very run down. It was found at the time that she had an enlarged thyroid gland besides acute bronchitis. This was not the first time she had the swelling in her neck as previously she had painted her neck with iodine which caused it to disappear. Whilst doing her hair a couple of months ago she noticed that her neck presented a distinct swelling. She lives under fair surroundings, is regular with her meals and has had no accidents. Previous illnesses were measles, whooping cough as a child.

Family: Father alive and well. Mother alive and well. 3 sisters alive and well.

Her menses are irregular since the appearance of the goitre.

State on Examination: She is of average intelligence, her height is 5 ft. and her weight 8 st. There are no developmental errors, no signs of jaundice, cyanosis or dropsy. She is

markedly anaemic. Temp. 98.4.

Alimentary System: Her appetite is poor of late but otherwise good. She has no thirst. She feels quite comfortable before, during and after meals. At present she is suffering from heartburn, flatulence and eructations. Her lips are of poor color, her tongue is coated, there is no dysphagia, no vomiting. Her bowels are very irregular.

Abdomen, Inspection: Rather prominent, musculature tone of abdominal wall poor. The movements are fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. The thyroid gland presents a horseshoe shaped swelling more marked on the right side and extending from the cornua of the ~~thyroid~~ HYOID bone to above the clavicles. The swelling follows the movements of deglutition and shows the characteristic flatness well on side view. There are no dilated veins and no pulsation detectable in the neck. On palpation the swelling is soft,

painless, does not pulsate or fluctuate and becomes distinctly larger with each menstrual period.

RBC = 4,250,000, WBC = 6900, Hb = 65,

CI = .7, DC = polymorpheus 60%, SL = 26%,

LL = 10%, Eosin = 3%, Basophyls = 1%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, light amber; S.Grav. 1015; reaction, acid; a deposit of mucus. No other abnormal constituents.

Microscopically: Some catarrhal cells and a few rod shaped organisms.

Diagnosis: Colloid goitre.

Prognosis: The outlook is fair. The disease is yet comparatively limited in its progress so that medicinal measures should cause a disappearance of the goitre.

Treatment: Calomel gr.II in tablet form are taken nightly for a fortnight. Then gr.X of Thymol and gr.½ of Thyroid extract each in tablet form are taken alternatively each night for 3 weeks. The extract is then taken twice a week for 1 week, then once weekly and discontinued for another week. The treatment is continued for 3 months. All fats, oils and alcohol are to be avoided during the Thymol

medication and all potable waters previously boiled. A change in residence is very desirable.

Name: F.S., age 33, sex male, occupation tailor.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 11 years.

History, personal: For a considerable number of years he has been troubled with his stomach. He suffers a good deal from discomfort after meals with a continuous gnawing pain under the left shoulder blade, and from flatulence which at times makes his breathing difficult and from shooting pains through the heart. The lump in the neck came on after these symptoms had been present for several years but he was too much occupied by them to take any notice of the lump in his neck. He has had no accidents, lives under fair surroundings and takes his food when he feels like it. As a child he had scarlet fever.

Family: Father died from fractured pelvis. Mother had a small goitre but died of pneumonia in 1918. 2 sisters both goitrous. 1 brother alive and well.

State on Examination: He is of fair intelligence and very introspective. His height is 5 ft. 11 ins. and his weight 9 st. There are no developmental errors, no signs of jaundice,

cyanosis, dropsy but anaemia is marked.

Temp. 98.4.

Alimentary System: His appetite is variable but does not suffer from thirst. ~~Afterwards~~ At Times he belches a good deal of wind. Heartburn, waterbrash and flatulence make his life a misery. He has now a complete set of false teeth. His tongue is furred but there is no dysphagia. He frequently resorts to vomiting to get relief from his distension. Unless he takes liquid paraffin his bowels refuse to move.

Abdomen; Inspection: Rather prominent below the umbilicus and retracted above it. Abdominal wall poorly developed. Movements poor.

Palpation: He is rather tender over the appendicular regions and over the descending colon. Resistance is met with in these areas, no fluctuation.

Percussion: Tympanitic note over the epigastrium. Percussion note much impaired elsewhere.

Auscultation: Borborygmi.

Haemopoietic System: The spleen, lymphatics, and glands are not enlarged. The thyroid is markedly enlarged and presents several well marked swellings on its surface over which the skin is stretched, pale and shiny. There are 2 such swellings on the right side and one on

the left. These are oval in shape, smooth, painless, and fluctuation is detectable. The rest of the gland is firm, painless, does not pulsate or fluctuate.

RBC = 4,450,000, WBC = 7000, Hb = 65%, CI = .6, DC = polymorphems 67%, LL = 9%, SL = 23%, Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, straw; reaction acid, S.Gr. 1025; a large deposit of mucus. No other abnormal constituents. Microscopically: catarrhal cells.

Diagnosis: Fibro cystic goitre.

Prognosis: Owing to the presence of goitre in the family and to its lengthy duration which has caused permanent degenerative changes no response to medical measures will result. The prognosis is consequently bad.

Treatment: The aim is to conserve any thyroid tissue that may still be functionating. Calomel gr.II and Thymol gr.X each in tablet form are taken nightly for a fortnight. The Calomel is then discontinued and gr.V of Pot.Iodide in tablet form are taken for 4 weeks. The Iodide is

then discontinued for a fortnight. The treatment is to be continued for 3 months as a minimum. Whilst the general health improved the goitre remained unaffected by the treatment. During the Thymol medication all fats, oils and alcohol to be avoided and all potable waters to be previously boiled.

Name: W.R., age 12, sex male, occupation at school.

Place of Birth: Spennymoor. Place of Residence: Chilton.

Complaint: Fits and lumps in the neck.

Duration: 6 months.

History, personal: About 4 weeks ago his mother saw him taking a fit, a thing he has never done before. To revive him she undid the neck of his shirt and found a lump there. She is quite positive that she has never noticed a swelling in his neck before and believes it is due to hurting himself during the seizure. Apart from the present trouble he has always been healthy and has never sustained an accident of any consequence. The surroundings at home are good and he takes his meals regularly. His previous illnesses were diphtheria, measles and chicken pox.

Family: Father alive and well. Mother alive and well. No brothers or sisters. A sister on the mother's side was goitrous.

State on Examination: The boy is intelligent, stands 4 ft. 7 ins. in height and weighs 5 stone. There are no developmental errors, no signs of dropsy, cyanosis or jaundice. Anaemia is fairly well marked. Temp. 98.4.

Alimentary System: His appetite is good, and he

experiences no thirst or any abnormal sensations during or after meals. He has no heartburn, waterbrash or flatulence. His lips are healthy and his teeth good. The tongue is somewhat furred. There is no difficulty in swallowing. He does not vomit and his bowels are regular.

Abdomen, Inspection: No prominence, rigidity, or retraction and the movements are good.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The lymphatic vessels, glands and spleen are not enlarged. In the situation of the thyroid there is a marked swelling about the size of a pigeon's egg which follows the movements of deglutition being more prominent during this act. The skin over the swelling is not adherent, there are a few dilated veins but no pulsation is detectable. On palpation the swelling is found to occupy the position of the isthmus and is painless, nodular to the touch, cannot be moved from the rest of the gland which is also enlarged, does not pulsate nor is fluctuation detectable. On auscultation no adventitious sounds are audible.

RBC = 4,375,000, WBC = 5000, Hb = 70%,

CI = .8, DC = polymorphonuclears 68% SL = 19%

LL = 7% Eos = 5% Basophyls = 1%

Circulatory, Respiratory and Nervous Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, pale straw with mucus and catarrhal cells floating about and a thick deposit of mucus. S.Gr. 1010. Reaction, acid. No other abnormal constituents.

Microscopically: Numerous catarrhal cells, but no organisms detectable

Diagnosis: Parenchymatous goitre.

Prognosis: As there is a history of goitre on the side of one of the parents there is probably an hereditary instability of the gland in his case which predisposes him to the disease. The disease is however of short duration and will respond to medical measures. On the other hand there is always a possibility of its relapse at a later date.

Treatment: is commenced with 1 grain Calomel in tablet form nightly for 14 days. Then gr.V of Thymol in tablet form each night and a teaspoonful of Syrupus Ferri Iodidi thrice daily for 3 weeks when the syrup is taken once daily

and then left off for a week. This is then resumed as before for a corresponding period of 3 weeks until 3 months treatment has been completed. For the rest of his life a teaspoonful of the Syrup is administered, ~~once monthly~~. During the administration of the Thymol all fats and oils are to be avoided and all potable waters to be boiled previously. A teaspoonful of the Syrup is then taken once every 3 months, thence once in 6 months and so on.

Name: B.R., age 18, sex male, occupation tobacconist.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Prominence of the neck.

Duration: 6 months.

History, personal: He cannot account for the swelling in his neck as he has always been healthy. His attention was drawn to a swelling in his neck owing to undue pulsation and a sense of fullness. Following this a swelling appeared but he does not now feel it as he has got used to the pulsation. He thinks the swelling appeared on both sides simultaneously but has never caused any trouble with swallowing, breathing or speaking. He lives under fair surroundings, takes his food regularly and has had no accidents. As a child, mumps and diphtheria.

Family: Father alive and well. Mother has a goitre. 2 brothers goitre free. 3 sisters, one of whom is goitrous.

State on Examination: He is a bright intelligent youth and makes light of his troubles. Stands 4 ft. 9 ins. in height and weighs 8 st. 12 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia.

Temp. 98.4.

Alimentary System: His appetite is good and he does not suffer from thirst. He rarely feels discomfort after meals. His teeth are good, his tongue clean, there is no dysphagia, no vomiting and one motion daily.

Abdomen, Inspection: No prominence or retraction. Abdominal wall well developed. Movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. In the situation of the thyroid is a fair sized enlargement, horseshoe shaped, showing the characteristic flatness on side view and follows the movements of deglutition. The swelling is not adherent to the skin or the surrounding structures. Running over it are several dilated veins and considerable pulsation is detectable in the neck. On palpation the swelling is firm, painless, does not pulsate nor fluctuate. On auscultation, a haemic murmur is audible in the neck.

RBC = 4,850,000, WBC = 6,850, Hb = 85%,
CI = .8, DC = polymorphs 72%, SL = 15%,
LL = 11%, Eosin = 2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction, acid; Sp.Gr. 1015; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells in large numbers and rod shaped. Gram negative organisms.

Diagnosis: Parenchymatous goitre.

Prognosis: Owing to the tendency to develop goitre there is a danger of relapse. It is,however, of short duration and has developed fairly late in his life so that with proper treatment it may be kept under control.

Treatment: Calomel gr.II in tablet form is taken nightly for 14 days. Then gr. X of Thymol and gr½ of Thyroid extract,each in tablet form, are taken alternately every night for 3 weeks. The extract is then taken twice in a week, then once in a week and discontinued for another. The treatment is continued for 3 months. Owing to the family history of goitre a change of residence is very desirable. Gr.V of Pot. Iodide in tablet form should be taken once in 3 months, then once in six months and so on. All fats, oils and alcohol to be avoided. All potable waters to be previously boiled.

Name: Mrs. E.B., age 37, sex female, occupation Housework.

Place of Residence: Windlestone. Place of Birth: Windlestone.

Complaint: Lump in the neck.

Duration: 7 years on and off.

History, personal: The present trouble started 7 years ago although she was then quite well. It commenced as a fullness of the neck, gradually got bigger until it became quite conspicuous. She then went to Tynemouth for a change when the swelling decreased and finally disappeared. She then returned and 4 months later noticed her neck was again getting thicker. She now commenced to paint the swelling with iodine and believes it had some effect as the swelling became smaller. On becoming pregnant some time afterwards she noticed that the iodine was not keeping the swelling down, instead it became much larger. She takes her food regularly, lives under fair conditions, has had no accidents and as a child had chicken pox and mumps.

Family: Father alive and well. Mother had a goitre but died from appendicitis. 3 sisters, none of them goitrous. 4 brothers alive and well.

Her menses commenced at 14 and have been regular.

State on Examination: She is an intelligent woman, stands 5 ft. 7 ins. in height and weighs 8 st. 12 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy. Slightly anaemic. Temp. 98.4.

Alimentary System: Her appetite is good, she does not suffer from thirst, rarely has heartburn, waterbrash or flatulence. Her lips are of good color, there is no dysphagia, her tongue is clean, her teeth are all false. She rarely vomits and has a motion daily.

Abdomen, Inspection: Slight prominence below the umbilicus and retraction above it. Abdominal wall well developed. Movements fair.

Palpation: No resistance, tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: The spleen, glands and lymphatics are not enlarged. The thyroid presents a well marked enlargement with several oval areas on its surface, one in the left lobe and three in the right. Over these areas the skin is thin pale and stretched, whereas elsewhere it is loose and thrown into folds. The rest of the gland is also enlarged, firm, painless, non pulsatile and non fluctuating. The oval areas are adherent to the rest of the thyroid, and

pulsation in them is detectable. On auscultation a haemic murmur is heard in the neck.

RBC = 4,750,000, WBC = 6730, Hb = 80%,

CI = .7, DC = polymorpheas 80%, LL = 4%

SL = 14%, Eosin = 2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; reaction, acid, Sp.Gr. 1025; a large deposit of urates. No other abnormal constituents.

Microscopically: amorphous urates. No organisms detectable.

Diagnosis: Fibro - cystic goitre.

Prognosis: Owing to the long duration of the goitre and the presence of permanent degenerative changes, a response to medical treatment is not to be looked for and the prognosis is correspondingly bad.

Treatment: Aims at the conservation of any thyroid tissue that may still be functionating.

Calomel gr.II in tablet form and Thymol gr.X in tablet form are taken alternately each night for a fortnight. The Calomel is then discontinued and gr.V of Pot Iodide in tablet form is given together with the Thymol alternately for

4 weeks. The Iodide is then discontinued for a fortnight. Treatment to be continued for 3 months. Whilst her general health was much improved the effect on the goitre was trivial. All fats, oils and alcohol to be avoided and all potable waters boiled.

Name: G.H., age 13, sex female, occupation at school.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 18 months.

History, personal: 18 months ago her mother noticed that her neck was getting rather prominent in front. It started on the right side first, about the size of a pigeon's egg when first noticed. It gradually spread to the other side taking about 6 months to do so. At this time she painted it with iodine causing it to become smaller but it relapsed again to the present condition. She is much worried by the unsightliness of the swelling. She lives under fair surroundings, takes her food regularly, and as a child suffered from scarlet and measles.

Family: Father alive and well. Mother alive and well. 2 brothers alive and well.

Her menses have not started yet.

State on Examination: She is an alert girl of fair intelligence. Her height is 5 ft. and she weighs 6 st. There are no developmental errors, no signs of jaundice, cyanosis, dropsy. Anaemia is slightly obvious. Temp 98.4.

Alimentary System: Her appetite is good and she does

not suffer from abnormal thirst. She suffers no discomfort before, during or after meals. Her lips are healthy, there is no difficulty in swallowing and no difficulty with deglutition.

Abdomen, Inspection: No prominence, retraction or flaccidity. Abdominal movements good.

Palpation: No rigidity, tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid forms a horseshoe shaped swelling extending from the thyroid region to above the clavicles. The swelling follows the movements of deglutition, more prominent on the right side and shows the characteristic flatness well on side view. There are no dilated veins or pulsations detectable in the neck. On palpation the swelling is soft, painless, does not pulsate or fluctuate. On auscultation a haemic murmur is audible in the neck.

RBC = 4,967,000, WBC = 7000, Hb = 90%, CI = .9, DC = polymorpheas 76%, SL = 20%, LL = 3%, Eosin = 1%.

Nervous, Respiratory and Circulatory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, light straw; reaction, acid; S.Gr. 1015; a deposit of mucus; no other abnormal constituents.

Microscopically: catarrhal cells, no organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: This is a type of goitre which is probably associated with the establishment of menstruation. It will yield to medical measures but will probably again appear during pregnancy unless treatment is continued.

Treatment: For a fortnight gr.I of Calomel in tablet form is taken nightly. Then gr.V of Thymol and gr.½ of Thyroid extract each in tablet form are taken alternately each night for 3 weeks. The extract is then taken twice a week for 1 week, then once a week and left off for a week. The treatment is carried out for 3 months. All fats, oils and alcohol to be avoided and all potable waters previously boiled.

Name: M.J., age 14, sex female, occupation at school.

Place of Birth: Ferryhill. Place of Residence: Chilton.

Complaint: Headache, pains in the legs and arms.

Duration: 2 days.

History, personal: In the early part of this year she came complaining of these symptoms and appeared to be suffering from an attack of influenza. During the examination the enlarged thyroid was detected in the neck although the parents had not noticed it. She now admits that the school medical officer had drawn her attention to it a year ago but took no notice of it. She thinks it enlarges with her periods. She is regular in taking her meals and lives under fair surroundings. She had a leg broken 5 years ago but that healed satisfactorily. Her previous illnesses were measles, tonsillitis and influenza.

Family: Father alive and well. Mother died of pneumonia. No brothers or sisters.

Menstruation started at 13 and has been irregular of late.

State on Examination: She is of average intelligence, 4 ft. in height and weigns 6 st. There are no developmental errors, no signs of jaundice, dropsy or cyanosis. She is anaemic at present.

Temp. 101.

Alimentary System: Her appetite is poor at present and she drinks rather a lot of water but this is not the rule. She experiences no abnormal sensations before, during or after meals. Her teeth are good, there is no dysphagia and her bowels are regular.

Abdomen, Inspection: Some general retraction all over. Abdominal wall fairly well developed. Movements good.

Palpation: No resistance, tenderness or fluctuation.

Auscultation or Percussion: Nothing to note.

Haemopoietic System: The lymphatics, spleen and glands are not enlarged. The thyroid gland is moderately enlarged, more so on the right side. It is horseshoe in shape, extends from the thyroid region to well above the clavicles and follows the movements of deglutition. The characteristic flatness on side view is well marked. The skin over the tumor shows some dilated veins but no pulsation is detectable. The swelling is smooth, painless, soft, does not pulsate or fluctuate.

RBC = 4,950,000, WBC = 6750, Hb = 85, CI = .8, DC = polymorphs 72%, SL = 24%, LL = 3%, Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; reaction acid; S.Gr. 1020; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells. No organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: This is a type of goitre which readily yields to medical measures so that the outlook is good.

Treatment: Calomel gr. I in tablet form is taken nightly for a fortnight. Then gr. V of Thymol and gr. ½ of Thyroid extract each in tablet form are taken alternately nightly for 3 weeks. Then extract is then taken twice a week for 1 week, the once a week for a week and discontinued for another. The treatment is carried out for 3 months. All fats, oils and alcohol to be avoided. All potable waters to be previously boiled.

Name: Miss M.C., age 19, sex female, occupation at home.

Place of Birth: Glasgow. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 1 year.

History, personal: The present trouble dates back to her arrival two years ago from Glasgow where she was in good health and continued so for some months whilst residing here. She then observed that her neck was getting unduly prominent and increased in size until now there is quite a distinct prominence in her neck. Besides the swelling she is not troubled with either her voice or her breathing. She takes her food regularly, lives under favourable surroundings and has had no accidents. As a child she had whooping cough and broncho pneumonia.

Family: Father alive and well. Mother alive and well. 3 brothers alive and well. 4 sisters alive and well.

Her menses commenced at 15 and have been regular all the while.

State on Examination: She is of average intelligence stands 5 ft. in height, weighs 6 st. 9 lbs. There are no developmental errors, no signs of

jaundice, cyanosis, dropsy or anaemia.

Temp. 98.4.

Alimentary System: She takes her food well and does not suffer from thirst. Before, during and after meals she feels quite comfortable. Seldom suffers from heart burn, water brash or flatulence. Her teeth are good, her tongue clean, there is no dysphagia, rarely vomiting and a motion once daily.

Abdomen, Inspection: General fullness, abdominal wall developed well, movements fair.

Palpation: Slight general rigidity, no tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid gland presents a horse shoe shaped swelling extending from the thyroid region to above the clavicles, which follows the movements of deglutition and shows the characteristic flatness well on side view. The swelling is larger on the right side, is not adherent to the surrounding structures, is soft, smooth, painless, does not pulsate or fluctuate. A few dilated veins are visible but no pulsation.

Auscultation: a haemic murmur is audible.

RBC = 4,850,000, WBC = 6500, Hb = 95%, CI = .9,

DC = polymorphous 69%, LL = 6%, SL = 24%, Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction acid; S.Gr.1025; no albumen, blood, bile, pus or sugar. A deposit of mucus.

Microscopically: catarrhal cells. No organisms detectable.

Diagnosis: Colloid goitre.

Prognosis: The outlook as regards alleviation of the goitre is good. It is of short duration and apparently no permanent changes have yet taken place. Should she leave the goitrous area spontaneous recovery will probably take place.

Treatment: For a fortnight gr.I of Calomel in tablet form is taken each night. Then gr.V of Thymol and gr½ of Thyroid extract each in tablet form alternately nightly for 3 weeks. The extract is then taken twice a week for 1 week, once for one week and discontinued for another. The treatment is continued for 3 months. All fats, oils and alcohol to be avoided. A change in residence is very desirable.

Name: Mrs. C.K., age 43, sex female, occupation housework.

Place of Birth: Alnwick. Place of Residence: Chilton.

Complaint: Swelling in the neck.

Duration: 20 years.

History, personal: As far as she can remember the swelling in her neck came on shortly after the birth of her first child 22 years ago. Owing to the difficulties in the delivery she developed "puerperal fever" from which she apparently recovered only to fall a victim to goitre later. She was recommended to paint the swelling with iodine but on the whole did not bother herself much about it as it did not give her any trouble. She believes it gets smaller now and again but for the last ten years has remained stationary more or less. She lives under fair surroundings, takes her food regularly, has had no accidents. Previously she suffered from Influenza and Bronchitis.

Family: Father dead, cause unknown. Mother died of old age. 3 sisters alive and well. 4 brothers alive and well.

Her menses commenced at 15 but give her no trouble.

State on Examination: She is of fair intelligence, stands 4 ft. 5 ins. in height and weighs 9 st.

There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia.

Temp 98.4.

Alimentary System: She takes her food well, does not suffer from thirst, occasionally has discomfort after meals when she suffers from heart burn or flatulence. Her teeth are all false. Her tongue is clean, there is no dysphagia, no vomiting and no difficulty with her bowels.

Abdomen, Inspection: Her abdomen is prominent, abdominal wall is flabby, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. In the situation of the thyroid is a large swelling irregular in shape owing to the presence of several marked swellings confined to the right lobe. The rest of the thyroid does not move very much with deglutition, is hard, painless, and does not fluctuate. The swellings are imbedded in the thyroid tissue, are painless, soft and fluctuating. The skin over this area is stretched and smoother than over the rest of the gland where it is atrophied and thrown into folds. There are no dilated veins detectable nor any pulsations in the neck.

RBC = 4,650,000, WBC = 7000, Hb = 85%,

CI = .8, DC = polymorpheas 85%, SL = 22%,

LL = 2%, Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, straw; reaction, acid; Sp.Gr. 1010; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells. No organisms detectable.

Diagnosis: Fibro cystic goitre.

Prognosis: Owing to the lengthy duration and the permanent degenerative changes the goitre will not yield to medical measures. The outlook as the regards the goitre is therefore distinctly bad.

Treatment: Aims at the conservation of any thyroid tissue that may still be functionating. Calomel gr.II and Thymol gr.X, each in tablet form, are taken alternatively each night for a fortnight. The Calomel is then discontinued and gr.V of Pot. Iodide is given alternatively with the thymol for 4 weeks. The Iodide is then left off for a fortnight. The treatment is carried out for 3 months. Whilst the

general health improved considerably the goitre remained unaffected. All fats, oils and alcohol to be avoided and all potable waters to be boiled.

Name: Miss F.P., age 29, sex female, occupation at home.

Place of Birth: York. Place of Residence: Windlestone.

Complaint: Thick neck.

Duration: 2 years, on and off.

History, personal: Six years ago she came to reside in this locality thinking the change would do her nerves good. She felt the benefit for the first six months when, owing to an attack of acute appendicitis, she had to undergo an operation from which she made a good recovery. During her convalescence in hospital she was told of the presence of a goitre in her neck which disappeared during her stay at a convalescent home. She then returned here and a year later started to be troubled with her neck, again, this time growing much quicker. She has never had any trouble with her voice or her breathing. As a child she suffered from measles, broncho pneumonia and otitis media. She lives under fair surroundings and takes her food well.

Family: Father killed in the war, mother alive and well. 3 sisters alive and well. 5 brothers alive and well.

Her menses started at 13 and are quite uneventful.

State on Examination: She is of fair intelligence, with a good deal of introspective phenomena Her height is 5 ft. 3 ins. and her weight 7 st. She presents no developmental errors, no signs of jaundice, cyanosis or dropsy. Somewhat anaemic. Temp 98.4.

Alimentary System: Her appetite is variable but she does not suffer from thirst. After meals she suffers from distension relieved by belching of wind or by vomiting. Heartburn and flatulence give her a good deal of trouble. Her teeth are badly decayed, her tongue is furred. She has no difficulty in swallowing. Her bowels are constipated.

Abdomen; Inspection: Abdomen is much distended, especially centrally. The abdominal wall is poorly developed, the movements are fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion: General tympanitic note.

Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid presents a well marked horseshoe shaped swelling, irregular on the surface owing to the presence of 3 small oval areas about the size of a pigeon's egg, 2 situated on the right and 1

on the left lobe. They cannot be moved apart from the rest of the gland which is also enlarged but firmer than the swellings, in which fluctuation is detectable. The swelling does not move very much with the act of deglutition. On auscultation a haemic murmur is audible in the neck.

RBC = 3,640,000, WBC = 5700, Hb = 60%,

CI = .8, DC = polymorphonuclears 80%, LL = 4%,

SL = 15%, Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, straw; S.Gr. 1012; reaction, acid; a large deposit of urates. No other abnormal constituents.

Microscopically: amorphous urates. No organisms detectable.

Diagnosis: Fibro-cystic goitre.

Prognosis: As regards the goitrous state, is bad, as degenerative changes of a permanent character have taken place. No response is to be expected ~~to~~ From medicinal measures.

Treatment: The aim is to conserve any thyroid tissue that may still be functionating. In the first instance the septic state of the mouth

received suitable dental treatment. Calomel gr.II and Thymol gr.V each in tablet form are taken alternatively each night for a fortnight. The Calomel is then discontinued and gr.V of Pot. Iodide in tablet form is taken for 4 weeks. The Iodide is then discontinued for a fortnight. The treatment is carried out for 3 months. The general health improved considerably but the goitre remained unaffected. All fats, oils and alcohol to be avoided and all potable waters previously boiled.

Name: Miss M.T., aged 24, sex female, occupation milliner.

Place of Birth: Longtown near Carlisle.

Place of Residence: Windlestone.

Complaint: Difficulty in getting bowels to move and swelling in the neck.

Duration: 12 months.

History, personal: In March of last year she became employed as a milliner's assistant in this locality. The work she had to do was chiefly sedentary and indoors most of the day. She has as a result been feeling out of sorts and has experienced difficulty in getting her bowels to move. Since her arrival her she has in addition developed a goitre which comes and goes. Periodically she has an attack of diarhoea following on the constipation which clears her, and her health varies largely with the mode of action of her bowels. She cannot say whether the swelling in her neck is affected by the state of her bowels, but has noticed that while formerly it varied in size it seems to have become stationary of late. Her surroundings at home are fair, she takes her food when inclined for it, has had no accidents and as a child suffered from chicken pox and mumps.

Family: Mother alive and well. Father alive and well. 2 sisters alive and well. 4 brothers alive and well.

Her menses commenced at 14 but are very irregular.

Alimentary System: Appetite very poor, she is not very thirsty, suffers a good deal from flatulence, heartburn and waterbrash although she has no actual pain nor vomiting. Her teeth are all false. Her tongue is furred, no dysphagia. Her bowels are very constipated.

Abdomen, Inspection: Marked general distension. Abdominal wall of poor musculature and movements poor.

Palpation: Some resistance all over, no tenderness or fluctuation.

Percussion: Marked tympanicity all over.

Auscultation: Nothing to note.

Haemopoietic Sysyem: The spleen, lymphatics and glands are not enlarged The thyroid presents a fair sized swelling extending from about the thyroid region to well above the clavicles It follows the movements of deglutition and presents the characteristic flatness well on side view. It is about equally prominent on the two sides, is smooth, soft, painless, does not pulsate or fluctuate. There are no dilated veins nor any pulsation detectable

in the neck.

RBC = 4,250,000, WBC = 6000, Hb = 70%,

CI = .8, DC = polymorphous 68%, SL = 22%,

LL = 6%, Eosin = 2%, Baso = 2%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction, acid; Sp. Gr. 1012; large numbers of streaks of mucus floating about and a deposit of mucus. No other abnormal constituents.

Microscopically: Large numbers of catarrhal cells in various states of degeneration. No organisms detectable

Diagnosis: Colloid goitre.

Prognosis: Unless she takes more care of herself and pays greater attention to the calls of nature and, preferably, changes her occupation the disease is apt to progress and be obstinate to medical measures. The prognosis may be said to be moderately fair in this case.

Treatment: For a fortnight gr.II of Calomel are taken. The diet consists of a good proportion of vegetable detritus to stimulate peristalsis. Exercise to be taken daily in the open air and the sedentary habits to be discontinued. Then gr.X of Thymol in tablet form together with Thyroid extract gr.½ in tablet form to

to be taken alternately for 3 weeks each night. The extract is then taken twice a week for 1 week, then once a week for another and discontinued for another. The extract administration is then resumed and the treatment continued for 3 months. All potable waters to be boiled, and all fats, oils and alcohol to be avoided. A change in residence and occupation is very desirable.

Name: G.B., sex female, age 25, occupation housework.

Place of Birth: Grange-over-Sands. Place of Residence: Windlestone.

Complaint: A lump in the neck.

Duration: 3 years.

History, personal: During her first pregnancy, 3 years ago, she noticed her neck was getting rather swollen about the fifth month but as it gave her no trouble she paid no attention to it. With time it became much bigger and continued so until the baby was born. Then during lactation it remained about the same size and has remained more or less stationary since then. She lives under fair surroundings, takes her food well, has had no accidents and as a child suffered from enlarged tonsils and adenoids.

Family: Father killed in an accident. Mother alive and well. 3 brothers alive and well. 2 sisters alive and well. Her child is not goitrous.

Her labours are all full time and quite uneventful.

State on Examination: She is of average intelligence, stands 4 ft. 8 ins. in height and weighs 9 st. 3 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Abdomen, Inspection: Slight prominence centrally, no retraction, abdominal wall flaccid and with numerous striae gravidarum, movements fair.

Palpation: No tenderness, marked flaccidity, no fluctuation.

Percussion and Auscultation: Nothing to note.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Haemopoietic Systems: The lymphatics, spleen and glands are not enlarged. The thyroid presents a well marked enlargement with several oval shaped swellings in the right lobe varying in size. The thyroid as a whole is much enlarged extending from the thyroid region to above the clavicles. The skin over the swellings is stretched, pale, thin and shining, whereas elsewhere it is much looser and thrown into folds. The swellings are painless, fluctuate but do not pulsate and cannot be moved apart from the rest of the gland. The whole gland moves poorly with deglutition, is firm, painless and does not pulsate.

RBC = 5,320,000, WBC = 6300, Hb = 90%,

CI = .8, DC = polymorphous 70%, SL = 25%,

LL = 3%, Eosin = 1%, Baso = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; reaction, acid; Sp. Gr. 1025; a large deposit of mucus. No other abnormal constituents.

Microscopically: amorphous urates.

Diagnosis: Fibro cystic goitre.

Prognosis: As regards the goitre, is bad. Permanent degenerative chages have taken place in a comparatively short time so that the functional activity of the gland must be impaired to a considerable extent.

Treatment: Is directed towards the conservation of the thyroid tissue that may still be functionating as follows. Calomel gr.II in tablet form and Thymol gr.X in tablet form are given alternately each night for a fortnight. Then the Calomel is discontinued and gr.V of Pot. Iodide is given alternately each night for 4 weeks. The Iodide is then discontinued for a fortnight and then resumed until 3 months of treatment have been completed. Whilst the general health improved, the effect on the goitre was trivial. During the Thymol medication all fats, oils and alcohol to be avoided. All potable waters to be boiled previously.

Name: Mrs. E.S., aged 43, sex female, occupation at home.

Place of Birth: Dunbar. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 10 years.

History, personal: She first discovered a swelling in her neck whilst residing in Dunbar but it disappeared on its own account and for several years she has been free from it. However, since her arrival here it has again made its appearance. At times it appears smaller but never actually disappears, but during her last pregnancy she does not think it grew much bigger. Although of a fair size it does not cause her any inconvenience. She lives under fair surroundings, takes her food, regularly, has had no accidents and as a child suffered from measles.

Family: Father died of heart failure. 2 sisters alive and well Mother died of a "stroke". 3 brothers alive and well. Children unaffected.

Her menses commenced at 14 and are quite uneventful. Her labours are all full time.

State on Examination: She is of fair intelligence, stands 5 ft. 9 ins. in height and weighs 9 st.

There are no developmental errors, no signs of jaundice, cyanosis or dropsy. Slightly anaemic. Temp. 98.4.

Alimentary System: Her appetite is good and she does not suffer from thirst. Before, during and after meals she feels comfortable, rarely suffers from heartburn, waterbrash or flatulence. Her teeth are all false, her tongue is clean, there is no dysphagia, rarely vomits and has a motion daily.

Abdomen, Inspection: General prominence, abdominal wall flabby, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Haemopoietic System: The lymphatics, spleen and glands are not enlarged. The thyroid is markedly enlarged, forming a rounded swelling about the size of small orange, whichhangs by a pedicle in front of the upper part of the thorax. The swelling is firm, painless, does not move with deglutition, does not pulsate nor fluctuate. There are no dilated veins detectable nor any pulsations in it.

RBC = 4,800,000, WBC = 6000, Hb = 85%,

CI = .8, DC = polymorphous 65%, LL = 6%,
SL = 27%, Eosin = 1%, Baso = 1%.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, amber; reaction, acid; Sp. Gr. 1010; a large deposit of mucus is present. No other abnormal constituents.

Microscopically: catarrhal cells. No organisms detectable.

Diagnosis: Fibrous goitre.

Prognosis: A response to medical measures is not to be looked for here as the disease has advanced, owing to its lengthy duration, towards permanent degenerative changes. The outlook as regards the goitre is bad, but as regards the duration of life fair.

Treatment: The aim is to conserve the thyroid tissue that is still functionating. For a fortnight gr.II of Calomel in tablet form and gr.X of Thymol, also in tablet form, are taken on alternate nights for a fortnight. The Calomel is then left off and gr.V of Pot. Iodide in tablet form is given alternately with the Thymol each night for 4 weeks. The Iodide is then discontinued for a fortnight and the treatment is resumed until 3 months have been completed. Whilst the general health

improved, the goitre was unaffected. All fats, oils and alcohol to be avoided. All potable waters to be previously boiled.

Name: V.S., aged 27, sex female, occupation housework.

Place of Birth: Sheffield. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 2 years.

History, personal: She first began to suffer from goitre whilst in Sheffield where she received treatment but came to this locality 2 years ago with the swelling still present. Since then it has persisted increasing in size at intervals but smaller at others. Apart from the swelling it gives her no other trouble. She lives under fair surroundings, takes her food regularly, has had no accidents. Suffered previously from influenza in 1918 followed by broncho pneumonia.

Family: Father alive and well. Mother alive and well. 4 brothers - 2 killed in the war - 2 alive and well. 3 sisters alive and well. No children yet.

Her menses commenced at 16 and are quite uneventful.

State on Examination: She is of good intelligence. Her height is 5 ft. 11 ins. and her weight 8 st. 12 lbs. There are no developmental errors, no signs of jaundice, cyanosis or dropsy. Slightly anaemic. Temp. 98.4.

Alimentary System: Her appetite is good, she does not suffer from thirst, feels comfortable after meals, her teeth are good, her tongue is clean, there is no dysphagia, no vomiting and one motion daily.

Abdomen: Inspection: No prominence, slight general retraction, abdominal wall well developed, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. In the situation of thyroid is a well marked horseshoe shaped swelling which follows the movements of deglutition and presents the characteristic flatness well on side view. The swelling extends from the thyroid region to well above the clavicles. The skin over the swelling is not adherent, shows several dilated veins and pulsation is detectable in the neck. On palpation the swelling is soft, smooth, painless, does not pulsate or fluctuate. On auscultation a haemic murmur is audible in the neck.

RBC = 4,950,000, WBC = 6500, Hb = 85%,

CI = .8, DC = polymorphs 76%, SL = 20%,

LL = 3%, Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction, acid; Sp. Gr. 1010; no other abnormal constituents; a deposit of mucus.

Microscopically: catarrhal cells. No organisms detectable.

Diagnosis: Colloid goitre.

Prognosis: The outlook is fair. The duration of the disease is such as leaves some doubt as to whether the goitre is not a little too far advanced to be unduly optimistic, although on physical examination there are not yet any microscopic evidences of permanent changes.

Treatment: For a fortnight gr.II of Calomel is taken each night. Then the Calomel is left off, and gr.X of Thymol in tablet form and gr.½ of Thyroid extract in tablet form are given on alternate nights for 3 weeks. Then the Thymol is taken twice a week, then once a week for 1 week and discontinued for another. Treatment is carried out for 3 months as a minimum. All fats, oils and alcohol to be avoided and all potable waters to be boiled. A change of residence is very desirable.

Name: Miss Y.G., aged 23, sex female, occupation typist.

Place of Birth: Brussels. Place of Residence: Chilton.

Complaint: Goitre.

Duration: On and off for 12 months.

History, personal: 2 years ago she left Brussels to take the post of typist in this locality and was in excellent health then. In February last she had broncho pneumonia following on influenza and it was then that the goitre was discovered. She is sure she felt the swelling in her neck before this illness but does not know on which side it originated. Apart from the unsightliness it gives her no other trouble. She is regular in taking her meals, lives under fair surroundings, has had no accidents.

Family: Father killed in the war. Mother alive and well. 1 brother alive and well. No sisters.

State on Examination: She is of average intelligence, is 5 ft. 3 ins. in height and weighs 7½ st. She presents no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: Her appetite is good, she does not suffer from thirst, takes her food

comfortably. Her teeth are all false, her tongue is clean, there is no dysphagia, no vomiting and has a motion once a day.

Abdomen, Inspection: Slight prominence centrally. Abdominal wall well developed. Abdominal movements good.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Nervous, Respiratory and Circulatory Systems:

Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid presents a horseshoe shaped swelling, extending from the thyroid region to above the clavicles, about equally prominent on the two sides, follows the movements of deglutition and shows the characteristic flatness well on side view. A few dilated veins are visible but no pulsations. The swelling is firm, painless, smooth, does not pulsate or fluctuate.

RBC = 4,950,000, WBC = 7000, Hb = 85%, CI = .8, DC = polymorphous 69%, SL = 25%, LL = 4%, Eosin = 1%, Baso = 1%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; reaction, acid; Sp. Gr.

1025; a deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells. No organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: The prognosis is good. The goitre is of a type which will yield to medicinal measures. Apparently degenerative changes of a permanent character have not taken place.

Treatment: For a fortnight gr.II of Calomel in tablet form is given nightly. Then the Calomel is discontinued, and gr.X of Thymol in tablet form and gr.½ of Thyroid extract in tablet form are given alternately, each night, for 3 weeks. The extract is then taken twice a week for 1 week, then once a week for a week and discontinued for another. The treatment is carried out for 3 months as a minimum. All fats, oils and alcohol to be avoided and all potable waters to be boiled. A change in residence is very desirable.

Name: Miss M.S., aged 18, sex female, occupation governess.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 13 months.

History, personal: The present trouble originated about 4 months after assuming the employment of a governess and she believes it is due to having to carry the children about in her arms. Her attention was drawn to the swelling owing to a sensation of fullness in the neck where she found a lump on the right side. With time it spread to the other side as well and became rather prominent. She lives under good surroundings, is regular in taking her food, had a bruised ankle when 10 years of age and whooping cough as a child.

Family: Father killed by motor bus. Mother has a goitre. 1 sister has a goitre. 3 brothers alive and well.

Her menses commenced at 14 and are quite regular.

State on Examination: She is of fair intelligence, stands 4 ft. in height, weighs 7 st. 2 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: Her appetite is fair, she does not suffer from thirst, before, during and after meals she feels comfortable. Her teeth are all good, her tongue is slightly furred, there is no difficulty in swallowing, no vomiting and no constipation.

Abdomen, Inspection: The abdomen is not distended, slight general retraction, abdominal wall well developed, movements fair.

Palpation: No rigidity, tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. The thyroid presents a uniform horseshoe shaped swelling, more marked on the right side, which follows the movements of deglutition. The characteristic flatness is well brought out on side view. The skin over the swelling is not adherent, there are a few dilated veins but no pulsation detectable. On palpation the swelling is smooth, painless, does not pulsate or fluctuate. On auscultation a haemic murmur is audible.

RBC = 4,857,000, WBC = 7000, Hb = 85%,
CI = .8, DC = polymorphous 67%, SL = 23%,
LL = 7%, Eosin = 3%.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, straw; reaction, acid; Sp. Gr. 1012; a large deposit of mucus. No other abnormal constituents.

Microscopically: Catarrhal cells, gram negat. rod shaped organisms.

Diagnosis: Parenchymatous goitre.

Prognosis: The goitre is of a type which readily responds to medicinal measures. Its duration is comparatively short and no permanent degenerative changes have yet taken place. Consequently, one need not be pessimistic about the outlook.

Treatment: For a fortnight, each night gr.II of Calomel in tablet form is taken. Then gr.X of Thymol and gr.½ of Thyroid extract, both in table t form, are taken alternatively each night for 3 weeks. Then the extract is taken twice a week for 1 week, then once a week and then discontinued for another. The treatment is continued for 3 months. All fats, oils and alcohol to be avoided. All potable waters to be boiled.

Name: Miss M.S., aged 20, sex female, occupation cashier.

Place of Birth: New Biggin-by-Sea, Northumberland.

Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: On and off for over a year.

History, personal: Her present complaint began about 6 or 7 months ago after she arrived in this neighbourhood, and was attributed to a change in the drinking water. She then went back to her home in Northumberland and was pleasantly surprised to find that after 3 months residence there she was cured of her goitre. She then returned to resume her former occupation and after 2 months residence here she observed her neck was beginning to swell again. Owing to the sedentary nature of her occupation she is much troubled by constipation. Her previous illnesses were mumps, impetigo and ringworm. She lives under fair surroundings at home and at work. No accidents.

Family: Father alive and well. Mother died in childbirth. 3 sisters alive and well. 2 brothers alive and well.

State on Examination: She is of fair intelligence, 4 ft. 7 ins. in height and weighs 6 st. There

are no developmental errors, no signs of jaundice, cyanosis or dropsy. Anaemic to some extent. Temp. 98.4.

Alimentary System: Her appetite is variable, she does not suffer from thirst. After meals she often has distension relieved by eructations. Heartburn and waterbrash are often troublesome. Several of her teeth are lost, the rest are good. Her tongue is slightly furred, she has no dysphagia, rarely vomits but is badly constipated.

Abdomen: Inspection: Some prominence below the unbilicus, abdominal wall fairly muscular, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. In the situation of the thyroid is a fairly well marked horse-shoe shaped swelling, extending from the thyroid region to above the clavicles, which follows the movements of deglutition and shows the characteristic flatness well on side view. The skin over the tumour presents several dilated veins but no pulsation is visible in the neck. On palpation the

swelling is larger on the right side, soft, smooth, painless, does not pulsate or fluctuate. On ausculatation a haemic murmur is audible in the neck.

RBC = 4,850,000, WBC = 6750, Hb = 75%, CI = .7, DC = polymorpheus 63%, SL = 24%, LL = 10%, Eosin = 2%, Baso = 1%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction, acid; Sp. Gr. 1012; a large deposit of mucus but no other abnormal constituents.

Microscopically: Large numbers of catarrhal cells. No organisms detectable.

Diagnosis: Colloid goitre.

Prognosis: Is not quite so good as there are already evidences of gastro intestinal disorders which will require careful eradication to effect much relief from the treatment for the goitre.

Treatment: For a fortnight gr.II of Calomel was given. Then gr.X of Thymol in tablet form together with the administration of gr.$\frac{1}{2}$ of Thyroid extract, in tablet form, for 3 weeks. Then the Thyroid extract was given twice weekly for 1 week, then once weekly for a week and discontinued for 1 week. Its

administration was then resumed until 3 months of treatment had been completed. All fats, oils and alcohol to be avoided during the Thymol medication, and all potable waters to be boiled previously. A change in residence is very desirable.

Name: Miss J.C., aged 19, sex female, occupation waitress.

Place of Birth: Dumfrieshire. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 10 months.

History, personal: She came to this neighbourhood a year ago to seek employment as a waitress and was then quite well. Owing to the pressure of work she lost some flesh and it was then that she thought her neck was getting rather thick, which caused her considerable embarrassment owing to the nature of her work, and she plied the swelling with iodine. It grew bigger and extended to the other side as well. She lives under fair surroundings, takes her meals regularly and has had no accidents. As a child she had measles followed by broncho-pneumonia.

Family: Father alive and well. Mother alive and well. 4 brothers alive and well. 2 sisters alive and well.

Her menses commenced at 14 and are quite uneventful.

State On Examination: She is of fair intelligence, stands 4 ft. 3 ins. in height and weighs 6 st. 12 lbs. There are no developmental errors, no signs of jaundice, cyanosis or dropsy.

Anaemia is marked. Temp. 98.4.

Alimentary System: Her appetite is good, she does not suffer from thirst, after meals she feels fairly comfortable, rarely has heartburn or waterbrash. Several of her teeth are missing, her tongue is slightly furred, there is no dysphagia. She rarely vomits and has a motion daily.

Abdomen, Inspection: Slight general prominence, abdominal wall well developed. Movements fair. Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, spleen and glands are not enlarged. The thyroid presents a horseshoe shaped swelling, extending from the thyroid region to above the clavicles, which follows the movements of deglutition and shows the characteristic flatness well. The swelling is not adherent to the surrounding structures and is covered with a considerable number of dilated veins. Some pulsation is detectable in the neck. On palpation the swelling is soft, painless, smooth, does not pulsate nor fluctuate. On auscultation a haemic murmur is audible in the neck.

RBC = 4,350,000, WBC = 6800, Hb = 65%,

CI = .7, DC = polymorphonuclears 62%, SL = 26%, LL = 8%, Eosin = 2%, Baso = 2%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; reaction, acid; Sp. Gr. 1015; a large deposit of mucus. No other abnormal constituents.

Microscopically: Large numbers of catarrhal cells. No organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: The prognosis is fairly good. There is, however, the necessity for correcting the defective dentition to prevent gastro intestinal disorders. A careful attention to the general health together with the treatment should alleviate the condition.

Treatment: In the first instance the defective dentition received suitable treatment. Then gr.II of Calomel was given for a fortnight. Thymol in tablets of X grs. together with gr.½ of Thyroid extract were given alternately, nightly, for 3 weeks. The extract was then given twice a week for 1 week, once a week for another and discontinued for another. The treatment was then resumed until 3 months had been completed. During the Thymol administration all fats, oils and alcohol to be

avoided. All potable waters to be boiled previously. A change in residence is very desirable.

Name: Mrs. M.H., aged 22, sex female, occupation housework.

Place of Birth: Windlestone. Place of Residence: Windlestone

Complaint: Lump in the neck.

Duration: 2 years.

History, personal: During her first pregnancy 2 years ago she noticed that her neck was getting rather prominent. As she was too much occupied by her pregnant state she paid no attention to it. It increased with size but became somewhat smaller after parturition. She states that so long as she is not pregnant the goitre is not very conspicuous but grows bigger with every pregnancy, but after the last one it ceased to become smaller. Painting with iodine had no effect on it. She lives under fair surroundings, is very punctual with her meals and has never had any accidents. As a child she had mumps.

Family: Father alive and well. Mother alive and well. 3 sisters alive and well. 4 brothers alive and well. She has 3 children, all alive and well. Her labors were full time and quite uneventful.

She commenced to menstruate at 13.

State on Examination: She is a bright intelligent

woman and takes a big interest in her well-being. She is 4 ft. 8 ins. in height and weighs 8½ st. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: Her appetite is good. Her thirst is not abnormal, she feels confortable before during and after meals. She is rarely troubled with heartburn or flatulence, rarely vomits, has a good set of artificial teeth, her tongue is clean, there is no dysphagia, has one motion daily.

Abdomen, Inspection: Slight prominence below the umbilicus, somewhat flaccid abdominal wall, abdominal movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Ausculatation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid presents a uniform enlargement, horseshoe in outline, extending from the thyroid region to above the clavicles. The swelling follows the movements of deglutition, shows the characteristic flatness well on side view, is not adherent to the skin or the surrounding structures and several dilated veins run

across it. There is no pulsation detectable. On palpation the swelling is towards the firm side, painless, non pulsatile and non fluctuating.

RBC = 4,950,000, WBC = 6800, Hb = 90%,

CI = .9, DC = polymorphous 72%, SL = 20%,

LL = 6%, Eosin = 2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, cloudy straw; reaction, acid; Sp. Gr. 1014; a deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells and a few gram negative rod shaped organisms.

Diagnosis : Colloid goitre.

Prognosis: The goitre is of a type which may respond to medicinal measures which, however, must be carefully carried out. On the whole the prognosis is moderately good.

Treatment: For a fortnight gr. II of Calomel is taken each night. Then gr.X of Thymol in tablet form together with gr.½ of Thyroid extract, also in tablet form, for 3 weeks. Then the Thymol is given twice a week for 1 week and then once a week, being thereafter

discontinued for 1 week. The administration is then resumed until 3 months treatment is completed. During the Thymol medication all fats, oils, and alcohol to be avoided, and all potable waters to be previously boiled. A change in residence is very desirable.

Name: Miss V.R., aged 19, sex female, occupation chemist's assistant.

Place of Birth: Berwick on Tweed. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 7 months.

History, personal: She came to this neighbourhood 18 months ago and was quite well then. Owing to the influenza epidemic of February last she became ill, but returned to work whilst still very weak. Shortly after she noticed a growth in her neck for which painting with iodine was advised. This had no effect on the swelling and now she has a fair sized goitre. Apart from the unsightliness of the swelling there are no symptoms. She lives under fair surroundings, has had no accidents, takes her food regularly and, as a child, suffered from chicken pox.

Family: Father alive and well. Mother alive and well. 3 brothers alive and well. 4 sisters alive and well.

Her menses commenced at 15 and are quite uneventful.

State on Examination: She is of average intelligence, stands 4 ft. 8 ins. in height and weighs 7 st. 3 lbs. There are no developmental errors, no signs of jaundice, cyanosis or

dropsy. Slightly anaemic. Temp. 98.4.

Alimentary System: Her appetite is good and she does not suffer from thirst. Before, during and after meals she is comfortable, rarely troubled with heartburn or flatulence. Her teeth are partly false, the rest are good. Her tongue is clean. There is no dysphagia. One motion daily.

Abdomen, Inspection: No prominence or flaccidity; movements fair.

Palpation: No resistance, tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid presents a fair state of enlargement, more marked on the right side, which follows the movements of deglutition and shows the characteristic flatness well on side view. The skin over the tumour is not adherent and shows a few dilated veins. No pulsation is detectable in the neck. On palpation the swelling is soft, painless, smooth, does not pulsate or fluctuate.

RBC = 4,350,000, WBC = 5900, Hb = 70%,
CI = .8, DC = polymorphous 60%, LL = 10%,
SL = 28%, Eosin = 2%.

Nervous, Respiratory and Circulatory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction, acid; Sp. Gr. 1010; no deposit. No other abnormal constituents.

Microscopically: nothing to note.

Diagnosis: Parenchymatous goitre.

Prognosis: The goitre is of short duration so that its departure from the normal cannot be very far advanced yet. Provided the treatment is carefully continued the prognosis is good.

Treatment: For a fortnight gr.II of Calomel in tablet form was administered. Then gr.X of Thymol in tablet form together with gr.½ of Thyroid extract, also in tablets, on alternate nights for 3 weeks. The extract was then given twice weekly for a week, then once a week for a week and then omitted for another. The treatment was then resumed until 3 months had been completed. All fats, oils and alcohol to be avoided during the Thymol medication. All potable waters to be previously boiled. A change in residence is very desirable.

Name: Mrs. B.J., aged 35, sex female, occupation housework.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 12 years.

History, personal: During her first pregnancy 13 years ago she was much troubled with a swelling in her neck. It continued to grow to a fair size until the child was born and by the time she had weaned it the swelling had almost gone, although she could still feel it in her neck. With the next pregnancy it began to enlarge again about the fifth month but remained quite distinct even after weaning this baby. With the third pregnancy it grew to a larger size again and remained enlarged ever since. The goitre gives her no trouble and were it not for its size she would not be aware of its presence. She takes her food regularly, lives under fair surroundings, has had no accidents and as a child had chicken pox.

Family: Father alive and well. Mother alive and well. 3 sisters alive and well. 4 brothers alive and well.

Her menses started at 15 and have always been

regular.

State on Examination: She is a very intelligent woman and gives a good account of herself; stands 4 ft. 7 ins. in height and weighs 10 st. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: Her appetite is good and she does not suffer from thirst. Before, during and after meals she feels comfortable usually whilst at other times she has heartburn and flatulence. Her teeth are all false, her tongue is slightly coated and she has no dysphagia. She rarely vomits and her bowels are regular.

Abdomen, Inspection: Slight prominence in the hypogastrium. Large numbers of striae gravidarum, abdominal wall flabby, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. The thyroid is enlarged and presents several nodular swellings, about the size of a marble, scattered throughout both lobes. The rest of the gland is

firm, painless and enlarged. These swellings are oval in shape, cannot be moved apart from the rest of the gland, do not pulsate but fluctuation is detectable in them. On auscultation a haemic murmur is audible in the neck.

RBC = 4,875,300, WBC = 6400, Hb = 85%,

CI = .8, DC = polymorphous 68%, SL = 25%,

Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, straw; reaction, acid; Sp. Gr. 1015; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells in large numbers. A few rod shaped gram negative organisms are detectable.

Diagnosis: Fibro cystic goitre.

Prognosis: The outlook as regards the goitre is bad as the gland's power of recovery is exhausted. No beneficial effect on the thyroid is to be expected from medicinal measures.

Treatment: The aim is to conserve any thyroid tissue still functionating. $\overset{(2)}{\text{II}}$ grs. of Calomel together with gr.X of Thymol in

tablet form are given on alternate nights for a fortnight. Then the Calomel is discontinued but gr.V of Pot. Iodide is administered on alternate nights with the Thymol for 4 weeks. The Iodide is then discontinued for a fortnight and resumed until 3 months of treatment are completed. Whilst the general health greatly benefited by this treatment its effect on the goitre was trivial. All potable waters are to be boiled, and all fats, oils and alcohol to be avoided.

Name: H.T., sex female, occupation housework, age 27.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 5 years.

History, personal: During the influenza epidemic of February last she was observed to have a well marked goitre. This she states had been present for 5 years but what caused it she cannot think of as she has always been a healthy woman. It first made its appearance as a distinct swelling on one side of the neck which went away of itself. In the March of 1920 it again appeared, growing much larger and extending to the left side of the neck as well, for which she was advised painting with iodine. Thinking she needed a rest she went to Sussex for a change and the swelling completely disappeared. 3 months after her return here it again reappeared, growing much more rapidly and attaining a large size. This has lasted for 3 years now. She has always been of good health, had no accidents, lives under fair surroundings and as a child had measles.

Family: Father alive and well. Mother had a goitre

which disappeared with treatment. No brothers nor sisters.

Her menses started at 16 and have been regular. She has had no children yet.

State on Examination: She is a bright intelligent woman and makes light of her troubles. She is 5 ft. 11 ins. and weighs 8 st. 12 lbs. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: She takes her food well and does not suffer from thirst. Before, during and after meals she feels quite comfortable. Her lips are healthy, her teeth are all false, her tongue is clean and she has no difficulty in swallowing. One motion daily.

Abdomen, Inspection: Slight general fullness, no retraction, abdominal wall well developed, movements fair.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. In the situation of the thyroid gland there is a well marked swelling, horseshoe in shape, extending from the thyroid region to above the clavicles,

about equally prominent on both sides and follows the movements of deglutition. The swelling is not adherent to the skin which is thrown into numerous folds over it and there are no dilated veins detectable. On palpation it is lobulated, firm, painless, does not pulsate or fluctuate.

RBC = 4,950,000, WBC = 6490, Hb = 90%, CI = .9, DC = polymorphous 73%, LL = 4%, SL = 21%, Eosin = 2%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; Sp. Gr. 1015; reaction, acid; a large deposit of mucus present. No other abnormal constituents.

Microscopically: large numbers of catarrhal cells. No organisms detectable.

Diagnosis: Fibrous goitre.

Prognosis: Owing to the comparatively lengthy duration and the permanent degenerative changes no response to medical measures is to be looked for. The prognosis as regards the goitre is bad.

Treatment: Aims at the conservation of any functionating thyroid tissue that may exist and it

(2)

is commenced by the administration of grs.II of Calomel in tablet form together with gr.X of Thymol also in tablet form for a fortnight. The Calomel is then left off and gr.V of Pot. Iodide in tablet form is given on alternate nights with the Thymol for 6 weeks. The Iodide tablet is then left off for a fortnight and then given alternately with the Thymol for another 6 weeks, and so on for 3 months. All potable waters to be boiled, and all fats, oils and alcohol to be avoided.

Name: Miss R.F., aged 24, sex female, occupation shop girl.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 16 months.

History, personal: For the last 6 or 7 months she has been much troubled with her monthlies which cause her severe pain before menstruation accompanied by a white discharge. She is also much troubled with constipation. She notices that whilst menstruating the lump in her neck gets bigger but never actually goes away. The swelling in her neck gives her no trouble apart from its disfigurement. She has been painting it with iodine for about 6 months with little effect. She lives under fair surroundings, takes her food when she feels inclined for it, has had no accidents and as a child suffered from scarlet and whooping cough.

Family: Father died of pneumonia following influenza. Mother alive and well. No sisters or brothers.

Menstruation commenced at 13.

State on Examination: She is of average intelligence, shows no developmental errors, is 4ft. in height and weighs 7 st. There are no signs

of jaundice, cyanosis or dropsy. Anaemia is marked. Temp. 98.4.

Alimentary System: Her appetite is variable, she does not drink much, feels rather distended after food, suffers much from heartburn and flatulence. Her teeth are decayed in several places with swollen and retracted gums. Her tongue is furred. There is no dysphagia. She vomits at times to get relief from the gastric discomfort. Constipation is marked.

Abdomen, Inspection: Marked general distension, abdominal wall poorly developed, movements poor.

Palpation: Some general rigidity. Tenderness over the descending colon. No fluctuation.

Percussion: Marked tympanicity.

Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, spleen and glands are not enlarged. The thyroid forms a distinct swelling in the neck, horseshoe in shape, follows the movements of deglutition and shows the characteristic flatness on side view. The right side is the more prominent. The skin over the tumour shows several dilated veins but is not adherent. On palpation the swelling is soft, painless, not adherent to the surrounding structures, does not pulsate

or fluctuate. On auscultation a haemic murmur is audible.

RBC = 4,450,000, WBC = 6250, Hb = 65%, CI = .7, DC = polymorphous 76%, SL = 20%, LL = 3%, Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra..

Urine: color, amber; reaction, acid; Sp. Gr. 1025; a large deposit of urates. No other abnormal constituents.

Microscopically: amorphous urates.

Diagnosis: Colloid goitre.

Prognosis: The prognosis is not quite so good. The gastro intestinal & uteric disorders will render the response to the goitre treatment somewhat indefinite.

Treatment: The septic state of the mouth was remedied by suitable dental treatment and the constipation corrected as well as the anaemia. As a result the menstruation returned to its normal state again. The treatment for the goitre was then begun by continuing the administration of II (2) grs. of Calomel for a further 2 weeks. Then gr.X of Thymol in tablet form together with gr.½ of the Thyroid

extract, also in tablet form, were given on alternate nights for 3 weeks. Then the Thyroid extract is given only twice weekly and then once weekly for another 3 weeks and then left off for 1 week. The treatment is then continued until a minimum of 3 months is completed.

Name: Miss A.L., aged 17, sex female, occupation at home.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Lump in the neck.

Duration: 5 months.

History, personal: Last year she was suffering from an attack of scarlet fever which necessitated her removal to an isolation hospital nearby. There she made an uneventful recovery and returned home. 5 months ago she became aware of a lump in her throat that followed the movements of deglutition which was attributed to the scarlet fever. She first noticed it on the right side and it becomes bigger with every menstrual period, so that now it is quite prominent. She was recommended to paint the swelling with iodine. Besides scarlet she had mumps and broncho pneumonia as a child. When 12 years of age she severely sprained her left ankle.

Family: Father alive and well. Mother alive and well. 2 sisters alive and well. 4 brothers alive and well.

Menstruation commenced at 14 and is quite uneventful.

State on Examination: She is of fair intellignece and rather highly strung, 4ft. 3 ins. in

height and 6 st. 2 lbs. in weight. There are no developmental errors, no signs of jaundice, cyanosis, dropsy or anaemia. Temp. 98.4.

Alimentary System: Her appetite is variable. She does not suffer from thirst. According to the state of her nerves she may or may not feel comfortable after meals. Flatulence and heartburn cause her much trouble at times. Some of her teeth are missing, the rest are good. Her tongue is furred, there is no dysphagia, no vomiting but the bowels require pills for their movement.

Abdomen, Inspection: No prominence, slight retraction above the umbilicus, abdominal wall is poorly developed, movements poor.

Palpation: Slight resitance over the epigastrium, also tenderness but not any fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The lymphatics, spleen and glands are not enlarged. The thyroid presents a moderate enlargement, horseshoe in shape, with the characteristic flatness on side view and follows the movements of deglutition. The swelling is about equally large on either side, is soft, painless, does not fluctuate or pulsate and is not adherent to the skin.

There are a few dilated veins running across it but no pulsation is detectable.

RBC = 4,937, 000, WBC = 6900, Hb = 85%, CI = .8, DC = polymorphous 65%, LL = 9%, SL = 24%, Eos = 2%.

Nervous, Respiratory and Circulatory Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, straw; reaction, acid; Sp.Gr. 1015; a deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells. No organisms are visible.

Diagnosis: Parenchymatous goitre.

Prognosis: Is a little uncertain owing to the element of neurosis being present which will have some effect on her general health and on the goitre. On the other hand it is a type in which medicinal measures are usually successful.

Treatment: For a fortnight gr.II (2) of Calomel in tablet form is administrated. Then gr.X of Thymol in tablet form together with gr.½ of Thyroid extract on alternate nights for 3 weeks. Then the Thymol Thyroid is administered only twice weekly and then once weekly, being

discontinued for 1 week after that. The treatment was then continued until 3 months as a minimum had been completed. A change in residence is very desirable. All fats, oils and alcohol to be avoided during the Thymol administration, and all potable waters to be boiled previously.

Name: Mrs. F., sex female, occupation housework.

Place of Birth: Ireland. Place of Residence: Windlestone.

Complaint: Severe abdominal pains, gastric catarrh, and goitre.

Duration: On and off for 3 years.

History, personal: She left Ireland 10 years ago to seek employment in this locality. At that time she was quite healthy and non goitrous. 3 years ago she began to experience discomfort after meals, was much troubled with belching of wind, her appetite became poorer, she began to have "rumbling" pains through her abdomen having no relation to food. Whenever her bowels are constipated she is much worse. The goitre she believes started after the second attack of "gastric catarrh" 2 years ago and whenever her "stomach is bad her goitre becomes much larger". She was admitted to the Royal Victoria Infirmary in Newcastle and a diagnosis of intestinal stasis confirmed. She, however, left before treatment was completed. Her surroundings at home are fair, she eats when the pains are away, has had no accidents and as a child suffered from chicken pox, scarlet and measles.

Family: Father and mother both dead. 1 brother

alive, has T.B. glands of the neck. No sisters or children.

State on Examination: She is of good intelligence and relates her history well. Her height is 5 ft. 2 ins. and her weight 10 st. There are no developmental errors, no signs of jaundice, cyanosis or dropsy. Rather anaemic. Temp. 98.4, but she has rises at times when she feels "poisoned". She has a "toxic" look about her, her skin is dry, harsh, atrophied and thrown into folds of a dirty muddy color. Her conjunctivae are very muddy looking. Much pigmentation around the eyelids.

Alimentary System: Her appetite is poor but varies. False appetites and cravings for "out of the way" things are common. Whilst fasting she may be quite comfortable or have severe pains, and after meals the same may happen. Flatulence, heartburn and waterbrash make her life a misery. Her teeth are few and far between, there are numerous stumps with purulent looking gums. There is no dysphagia. She has to vomit at times to get relief from the discomfort in her stomach. Her bowels are very irregular but now move with liquid paraffin.

Abdomen, Inspection: Abdomen markedly distended

all over, very flaccid, movements poor.

Palpation: Marked flaccidity, some tenderness under the right costal margin, the appendicular region and the descending colon.

Percussion: General tympanicity all over.

Auscultation: Nothing to note.

Respiratory, Nervous and Circulatory Systems:

Nothing to note.

Urinary System: At times she has pain in her back not related to micturition. No pain in the urethra or bladder.

Urine: color, amber; reaction, acid; Sp. Gr. 1025; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells. A few rod shaped gram negative organisms.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. The thyroid presents a horseshoe shaped enlargement, more prominent on the right side, which moves to some extent with deglutition but is irregular on the surface. There are areas more prominent than others over which the skin is more tightly stretched. These are scattered throughout both lobes varying in size from a pea to a marble. On palpation they appear soft but no fluctuation is detectable. The rest of the

gland is firm, painless, does not pulsate or fluctuate.

RBC = 4,500,000, WBC = 6400, Hb = 75%,

CI = .6, DC = polymorphous 72%, LL = 4%,

SL = 23%, Eos = 1%.

Diagnosis: Fibro cystic goitre.

Prognosis: The outlook as regards the goitre is bad. There is extensive gastro intestinal disorder which is rendered worse by the defective dentition and septic state of the mouth. The goitre has also extended beyond any hopes of the gland being able to recover.

Treatment: The aim is to conservate any functionating thyroid tissue which may be left and to alleviate the gastro intestinal disorder. In the first place the septic mouth received suitable dental treatment. Calomel in gr.II doses in tablet form was given together with gr.X of Thymol in tablet form on alternate nights for a fortnight. Then the Calomel was left off and gr.V of Pot. Iodide in tablet form is given on alternate nights for 4 weeks. The Iodide is then left off for a fortnight and then given alternately until 3 months treatment had been completed. Whilst the general health benefited the effect on the goitre was trivial.

Name: Mrs. L.B., aged 28, sex female, occupation housework.

Place of Birth: Wales. Place of Residence: Windlestone.

Complaint: Loss of appetite, constipation and swelling in the neck.

Duration: On and off for 3 years.

History, personal: In 1920 she was operated on in Cardiff for a left sided inquinal hernia. Since then she has had great difficulty in making her bowels move without the regular use of aperients. Loss of appetite and flatulence followed this. She is much troubled with "wind" in the stomach and she feels "balls" of wind rising in her throat which stick there. She has never had any difficulty in breathing or with her voice. Her surroundings at home are fair but she takes food when she feels inclined. When 5 years of age she had diphtheria. No accidents.

Family: Father alive and well. Mother alive and well. No brothers or sisters. No children.

Her menses commenced at 14 but she has suffered considerably from menorrhagia, dysmenorrhoea, leucorrhoea.

State on Examination: She is rather foolish and primitive yet; her height is 4 ft. 7 ins. and

her weight 6 st. 2 lbs. There are no developmental errors, no signs of jaundice, cyanosis or dropsy. Anaemia is marked. Temp. 98.4.

Alimentary System: Her appetite is poor. She does not feel thirsty. After meals she is very distended, belches a lot of wind, suffers much from heartburn, waterbrash and flatulence. her teeth are very decayed, the gums retracted, the tongue is furred, there is no dysphagia, she often resorts to vomiting to get relief from distension after meals. Her bowels are constipated.

Abdomen, Inspection: No prominence, general retraction, poor abdominal wall with defective movements.

Palpation: General tenderness all over the abdomen, no fluctuation.

Percussion: Impaired percussion note around the abdominal periphery.

Auscultation: Borborygmia.

Haemopoietic System: The lymphatics, glands and spleen are not enlarged. Thyroid presents a general enlargement, horseshoe shaped, showing the characteristic flatness well on side view. The thyroid tumour extends from the thyroid region to a finger's breadth above the clavicles. It follows the act of deglutition.

The swelling is somewhat lobulated over the right lobe, is painless, rather firm, does not pulsate or fluctuate and is not adherent to the skin. There are a large number of dilated veins running over the swelling and marked pulsation in the neck.

RBC = 4,500,000, WBC = 6200, Hb = 75%,
CI = .6, DC = polymorphous 72%, SL = 20%,
LL = 6%, Eosin = 1%, Baso = 1%.

Nervous, Respiratory and Circulatory Systems:

Nothing to note.

Urinary System: Pain in the back before and during menstruation. No pain in the bladder or urethra.

Urine: color, amber; Sp. Gr. 1017; reaction, acid; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells, gram. negat., rod shaped organisms.

Diagnosis: Colloid goitre.

Prognosis: The outlook is uncertain. The disease in the thyroid has lasted for a comparatively long time which has probably caused some amount of permanent change in the gland. In addition there is the gastro intestinal trouble to contend with which will probably require surgical treatment for its relief.

Treatment: Was commenced by correcting the defective dentition by suitable dental treatment and Calomel in tablet form of II (2) gr. doses were given for a fortnight. Then on alternate nights gr.V of Thymol in tablet form was administered for another fortnight when the Calomel was left off and gr.V of Pot. Iodide in tablet form was administered on alternate nights with the Thymol for 4 weeks. The Iodide tablet was then discontinued for a fortnight and then continued again. A course of 3 months is the minimum. All fats, oils and alcohol to be avoided during the Thymol medication. All potable waters to be boiled.

Name: Mrs. L., age 67, sex female, occupation charwoman.

Place of Birth: Darlington. Place of Residence: Chilton.

Complain: Swelling in the neck.

Duration: 40 years.

History, personal: The present trouble commenced 40 years ago when she was 27 years of age. She noticed the swelling in her neck 4 to 5 years after the birth of her first child. It commenced on the right side about the size of a marble and extended gradually to the left side. It increased in size every time she was going to have a baby and never became smaller during the interval. She did not take any medicine as it caused her no inconvenience other than dragging in her neck and being in the way sometimes. She has always been a healthy woman of regular habits as regards her food. She lives under fair surroundings and takes a gill of beer every night. Previously she had bronchitis, influenza, measles and whooping cough as a child. She fell downstairs 44 years ago and bruised her thigh.

Family: Father died of drowning. Mother died of typhoid. No brothers or sisters. 2 daughters

alive and well. No sons.

State on Examination: She is a woman of average intelligence, 5 ft in height and weighs 10 st. Her muscularity is fair and there are no developmental errors. She is somewhat anaemic but there are no signs of jaundice, dropsy or cyanosis. Temp. 98.4.

Alimentary System: Her appetite is fairly good and she is not abnormally thirsty. She experiences no abnormal sensations before, during or after meals. Troubled at times with flatulence and heartburn. Her teeth are few and far between and consist mainly of stumps with retracted gums. Her bowels are regular in action.

Abdomen, Inspection: The abdomen is fairly prominent with numerous striae gravidarum. The muscularity is poor and the movements fair.

Palpation: Markedly flaccid abdominal wall. No tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: The spleen, glands and lymphatics are not enlarged. The thyroid forms a marked swelling about the size of a large orange hanging down the front of the chest for about 6 ins. It is firm, hardly moves with deglutition, is painless, does

not fluctuate or pulsate. The skin is firmly attached over the swelling itself but loosely arranged elsewhere in the neck and very flabby. Running over it are a few dilated veins but no pulsation is visible in the neck.

RBC = 4,650,000, WBC = 6500, Hb = 75%, CI = .6, DC = polymorpheus 63, LL = 2%, SL = 24%, Eosin = 1%.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Urinary System: No pain in the back, urethra or bladder.

Urine: color, light amber; reaction, acid; Sp. Gr. 1025; a large deposit of mucus. No other abnormal constituents.

Microscopically: catarrhal cells in large numbers.

Diagnosis: Fibrous goitre.

Prognosis: Owing to the extensive degeneration and the long duration of the disease, coupled with the gastro intestinal disorder, no response is to be expected from medicinal measures. The outlook is bad.

Treatment: A course of the following treatment was given in order to conservate any functionating thyroid tissue, but the effect on the goitre was trivial. II (2) grs. of Calomel in

tablet form together with gr.X of Thymol in tablet form were given on alternate nights for a fortnight. The Calomel was then discontinued and gr.V of Pot. Iodide in tablet form was administered on alternate nights for 4 weeks. The Iodide tablet was then left off for 2 weeks and readministered for another 4 weeks and so on until a course of 3 months treatment was completed. At the same time the teeth received suitable dental treatment, but the result was trivial. Should pressing symptoms arise the further treatment is essentially surgical. During the Thymol administration all fats, oils and alcohol to be avoided and all potable waters to be previously boiled.

Name: G.R., age 6, sex female, occupation at school.

Place of Birth: Windlestone. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 12 months.

History, personal: 12 months ago whilst washing her the mother became aware that the child' neck was fuller than normal although she could not feel anything. Keeping her under observation she noticed that the swelling was getting gradually bigger so that after a few months she could feel it distinctly. She believes the right side was always the bigger of the two. During this period the child had a severe attack of measles causing her to lose much flesh and the swelling became quite distinct. She is quite sure the child never had a goitre although it is rather delicate in nature. She lives under fair surroundings and takes her food regularly. No accidents.

Family: Father alive and well; mother alive and well. 5 brothers alive and well. 4 sisters alive and well.

State on Examination: The child is shy, of moderate intelligence, shows no developmental errors, is 3 ft. 7 ins. in height and weighs 3 st.

Her muscularity is very poor. Anaemia is marked, no cyanosis, dropsy or jaundice. Temp. 98.4.

Alimentary System: The child's appetite is variable. She is not very thirsty. There is no pain or discomfort before or after meals. No heartburn or waterbrash. The lips are of poor color, the teeth very septic. There is no difficulty in swallowing. Her bowels like her appetite are very variable.

Abdomen, Inspection: No prominence, rigidity or retraction. Abdominal wall is flabby and the movements poor.

Palpation: No resistance, tenderness or fluctuation.

Percussion and Auscultation: Nothing to note.

Haemopoietic System: The thyroid forms a distinct horseshoe shaped swelling stretching from the level of the thyroid to well above the clavicles. On side view the flatness is well marked. The skin over the swelling is not adherent, there are a few dilated veins and some pulsation in the neck. On palpation the shape is confirmed with predominance in size on the right side. It is smooth, painless, not adherent to the surrounding structures, follows the movements of

deglutition, does not pulsate and no fluctuation is detectable. On auscultation a haemic murmur is audible in the neck. The lymphatic glands and spleen are not enlarged.

Circulatory, Respiratory and Nervous Systems:

Nothing to note.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, amber; Sp. Gr. 1010; reaction, acid; deposit of urates. No other abnormal constituents.

Microscopically: amorphous urates.

Diagnosis: Parenchymatous goitre.

Prognosis: The prognosis is somewhat uncertain. Although it is of a kind which yields to medical measures there is the possibility of its reappearance in later life.

Treatment: All the septic teeth together with those which show any tendency towards decay are to be removed. The enlarged tonsils together with any adenoids are to receive surgical treatment as well. A I gr. tablet of Calomel is given nightly for a fortnight. Then gr.V of Thymol in tablet form is given on alternate nights with a teaspoonful of Syrpus Ferri Iodidi for 3 weeks thrice daily. Then the syrup is taken once daily and then left

off for a week. This is then resumed as before for a corresponding period of 3 weeks until 3 months treatment is completed. After that a teaspoonful of Cod Liver Oil and Malt is given nightly for an indefinite period. During the administration of the Thymol all fats, oils to be avoided, and all potable waters to be previously boiled. A change of residence is very desirable.

Name: V.T., age 22, sex female, occupation typist.

Place of Birth: Portsmouth. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 6 months.

History, personal: In December last she came to this locality to take up the post of typist. As she had not been away from home before she felt it rather badly and believes her present trouble originated then. It was in February last, whilst dressing herself, that she noticed a swelling in her neck. As it was painless and not conspicuous at first she did not give it any attention but as it kept on enlarging she got concerned about it. She does not remember on which side it appeared first. She lives under fair surroundings, has had no accidents and as a child had whooping cough.

Family: Father alive and well. Mother alive and well. 2 brothers alive and well. 3 sisters alive and well.

Her menses commenced at 14 and are quite uneventful.

State on Examination: She is a bright somewhat highly strung girl of fair intelligence. Her height is 5 ft. 7 ins. and her weight 7 st. There are no developmental errors, no signs

of jaundice, cyanosis or dropsy. Slightly anaemic. Temp. 98.4.

Alimentary System: She has a good appetite and does not suffer from thirst. Before, during and after meals she feels quite comfortable. She has heartburn and flatulence at times. Her tongue is slightly furred, her teeth are all false, there is no dysphagia, rarely vomits, her bowels are regular.

Abdomen, Inspection: No distension or retraction, abdominal wall of good musculature. The abdominal movements are good.

Palpation: No resistance, tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Nervous, Respiratory and Circulatory Systems: Nothing to note.

Haemopoietic System: The spleen, lymphatics and glands are not enlarged. In the situation of the thyroid gland is a horseshoe shaped swelling, more prominent on the right side, which follows the movements of deglutition and shows the flatness well on side view. There are a few dilated veins running over the swelling but no pulsation is detectable. On palpation the swelling is soft, painless, does not pulsate or fluctuate. On

auscultation a haemic murmur is audible in the neck.

RBC = 4,750,000, WBC = 7000, Hb = 90%, CI = .9, DC = polymorphous 75%, LL = 3%, SL = 21%, Eosin = 1%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, light straw; Sp. Gr. 1020; reaction, acid. No other abnormal constituents. No deposit.

Microscopically: a few catarrhal cells visible, no organisms detectable.

Diagnosis: Parenchymatous goitre.

Prognosis: The goitre is of short duration and of the type that readily responds to medical measures so that the prognosis is good.

Treatment: For a fortnight gr.II (2) of Calomel in tablet form is administered. Then gr.X of Thymol in tablet form alternately with gr.½ of Thyroid extract in tablet form for 3 weeks. Then the Thymol R o I P is given twice a week for 1 week and then once a week for a week and discontinued for another week. The administration is then begun again until 3 months treatment is completed. All fats, oils and alcohol to be avoided and all potable waters to be previously boiled. A change in residence is very desirable.

Name: Mrs. S., age 53, sex female, occupation housework.

Place of Birth: Bishop Auckland. Place of Residence: Chilton.

Complaint: Swelling in the neck.

Duration: 36 years.

History, personal: When 17 years of age a swelling appeared in her neck which she attributed to the carrying of weights on her head. She first noticed it on the right side of her neck but as it was not very big and did not cause her any inconvenience she did not bother about it. She believes it went away for some time which she puts down to an improvement in her health on leaving the district. When she had her first baby 4 years later she began to notice that her neck was getting prominent again making its appearance about mid term. After the birth it still continued about the same size. She was advised to paint the swelling with iodine but after a few applications she gave it up as it did not seem to benefit her. She has always been troubled with indigestion and of recent years rheumatism. Her child caused her much suffering, otherwise she has always been a healthy woman.

Family: Father alive and well. Mother died of cancer of the stomach. No brothers. 1 sister, not goitrous. None of her children are goitrous.

State on Examination: She is of good intelligence, her height is 5 ft., and her weight is 7 st. There are no developmental errors. Her nutrition is good and there is no anaemia, cyanosis, jaundice or dropsy. Temp. 98.4.

Alimentary System: Her appetite has been getting poor of late but she is not very thirsty. She has no abnormal sensations during fasting but after meals she feels rather distended. Never any pain, but flatulence, waterbrash and heartburn make her life a misery. Her teeth are very defective, the gums are congested, retracted and at times ulcerated. She has no difficulty in swallowing and never vomits. Her bowels refuse to move unless she takes salts.

Abdomen, Inspection: Rather distended about the periphery and very flaccid, numerous striae gravidarum, no rigidity, movements are defective.

Palpation: Some general rigidity, no tenderness, no fluctuation.

Percussion: Tympanitic all over.

Auscultation: Borborygmie.

Nervous, Circulatory and Respiratory Systems:

Nothing to note.

Haemopoietic System: The lymphatic glands and spleen are not enlarged. The thyroid presents a horseshoe shaped swelling extending from the thyroid region to above the clavicles. The skin over it is not adherent but is very flabby and thrown into folds. No dilated veins are visible nor any pulsations. There is no pain in the swelling and it moves very little with deglutition. The right side is the more prominent. On palpation there are several large nodular swellings to be felt in both lobes. No fluctuation is detectable and the tumour mass is hard to the touch.

RBC = 4,750,000, WBC = 6,300, Hb = 85%, CI = .9, DC = polymorphous 70%, SL = 20%, LL = 5%, Eosin = 4%, Baso = 1%.

Urinary System: No pain in the back, bladder or urethra.

Urine: color, very cloudy; Sp. Gr. 1015; reaction, acid; large numbers of flakes of mucus floating about and a cloud of mucus deposit.

Microscopically: the field is crowded with catarrhal cells in various states of degener-

ation. Rod shaped organisms to be seen in large numbers.

Diagnosis: Fibrous goitre.

Prognosis: No response to medicinal measures is to be expected in this case as owing to the long duration of the disease, as well as to the degenerative changes, the gland has been rendered powerless to recover. There are also extensive evidences of gastro-intestinal disorders which will be difficult to correct immediately. The outlook is distinctly bad.

Treatment: Aims at the conservation of any functionating thyroid tissue. The septic state of the mouth was remedied by suitable dental treatment. (2) II grains of Calomel in tablet form together with gr.X of Thymol in tablet form were given on alternate nights for 2 weeks. The Calomel was then discontinued and gr.V of Pot. Iodide in tablet form was given for 3 weeks and then the Iodide was then left off for a fortnight. The treatment was then resumed until 3 months were completed. The effect on the goitre was trivial. During the Thymol medication all fats, oils and alcohol to be avoided. Potable waters to be boiled previously.

Name: Miss A.G., aged 27, sex female, occupation housework.

Place of Birth: Cockermouth in Cumberland. Place of Residence: Windlestone.

Complaint: Swelling in the neck.

Duration: 5 months.

History, personal: 5 months ago whilst washing her neck she felt a lump in her neck which she had not noticed previously. As she was suffering from a cold at the time she thought it would disappear with it. On which side it first appeared she is not sure as she could feel it on both sides when she discovered the lump. She lives under fair surroundings, has had no accidents and as a child suffered from measles.

Family: Father alive and well. Mother alive and well. 3 brothers alive and well. 4 sisters alive and well.

Her menses commenced at 15 and are quite regular.

State on Examination: She is a bright intelligent girl, 4 ft. 6 ins. in height, weighs 7 st., shows no developmental errors, no sign of jaundice, dropsy, cyanosis or anaemia. Temp. 98.4.

Alimentary System: Her appetite is good, she does not suffer from thirst. Before, during and

after meals she feels quite comfortable. She may occasionally have heartburn and flatulence but that is not often. Her tongue is clean, there is no dysphagia, rarely vomits and has a motion daily.

Abdomen, Inspection: No prominence or retraction, abdominal wall well developed, movements good.

Palpation: Slight general rigidity; no tenderness or fluctuation.

Auscultation and Percussion: Nothing to note.

Haemopoietic System: In the situation of the thyroid is a horseshoe shaped swelling, extending from the thyroid region to above the clavicles, which follows the movements of deglutition and shows the characteristic flatness well on side view. The skin over the swelling is not involved, there are a few dilated veins but no pulsation detectable. On palpation the swelling is found to be larger on the right side, is smooth, soft, painless, non pulsatile or fluctuating. On auscultation a haemic murmur is audible in the neck.

RBC = 5,000,000, WBC = 6750, Hb = 90%,

CI = .9, DC = polymorphs 75%, SL = 20%,

LL = 4%, Eosin = 1%.

Urinary System: No pain in the back, bladder or

urethra.

Urine: color, amber; Sp. Gr. 1010; reaction, acid; no deposit. No other abnormal constituents.

Microscopically: a clear field.

Diagnosis: Parenchymatous goitre.

Prognosis: The outlook is good. Her general condition is such as would not hinder the measures adopted for the treatment of the goitre. Its duration is short so that the gland's response is still good.

Treatment: Was begun by the administration of gr.II (2) of Calomel in tablet form for a fortnight. Then gr.X of Thymol also in tablet form was given together with gr.½ of Thyroid extract on alternate nights for 3 weeks. Then the Thyroid extract was given twice weekly for 1 week, then once weekly for 1 week and then discontinued for a week. It was then resumed until 3 months treatment had been completed. All fats, oils and alcohol to be avoided during the Thymol administration. All potable waters to be boiled previously.

Treatment.

In simple goitre too much stress cannot be laid on the role of preventative measures and the importance of early active treatment. The best prophylaxis for goitre is to avoid those areas where the disease is endemic, especially children of goitrous parents. Women living in endemic areas should receive treatment from the beginning of their pregnancy and this should be continued during the period of lactation, as by such measures not only is the hypertrophy of pregnancy avoided but the foetus from acquiring the disease. The establishment of hygienic surroundings both at home and at work, the proper disposal of all excreta both human and animal, the protection of the water supply from contamination by the construction of a water-tight system of canalisation and its collection into large reservoirs with efficient aeration and exposure to sunlight ~~is possible~~ are all essential if any measure of success is to attend prophylactic measures. Where it is possible to change the entire water supply this should be done. In those whose occupation exposes them to infection from the soil or water strict personal cleanliness is necessary to avoid the entrance of the disease. Those occupied in sedentary occupations should pay careful attention to the hygiene of the gastro-intestinal tract. When it is necessary to live in a goitre area the best prophylaxis is the boiling of the water, filtration

not being a sufficient safeguard. Marine[1] and Kimball have obtained excellent results among school children from the use of .2 gm. of sodium iodide distributed over a period of two weeks and repeated each spring and autumn, as during these two seasons the iodine content of the thyroid is apt to be very small. Furthermore it is advisable for the school children to wear a small bag around their necks containing the iodide as this had been shown to be an efficient prophylactic measure. E. Bircher[2] attacks the agitation in favour of the use of iodine as a prophylactic measure in school children as its use even in small quantities is frequently followed by thyropathy owing to the accumulation of iodine in the thyroid reaching enormous quantities. F. De Quervain[3] in his report to the Swiss Goitre Commission asserts that the proposed method of goitre prophylaxis by the addition of iodine to cooking salt and the inhalation of air rich in iodine as practised in France has apparently yielded no definite results. The nucleus of the question is the proper dosage. In adding iodine to the cooking salt the dose must be kept below the amount effective for goitre in adults. The elimination of goitre is too delicate a procedure to allow it to be carried out on so extensive a scale. On the other hand Wagner Jauregg[4] asserts that the use of cooking salt containing 2 mgm. of iodine salt to the Kilogram

serves to prevent the occurrence of endemic goitre. This form of treatment has the advantage of acting on the whole population in goitre areas beginning in utero and continuing throughout life independently of individual endeavour. Messerli advocates the use of intestinal antiseptics such as thymol as well as mercury and arsenic as a prophlactic measure.

M. Bircher[5] states that the condition of the thyroid should be ascertained before instituting the iodine treatment for goitre as symptoms alone do not suffice. There is a reliable method of examination by the calculation of the basal metabolism as it is under the control of the thyroid, and every disturbance of the thyroid must express itself therefore in an insufficient amount of the basal metabolism. The extent of such a resulting diminution of metabolism from the normal is also a measure of the functionating capacity or weakness of the thyroid. Every increase in basal metabolism contraindicates iodine therapy but a diminution of the same allows the administration of an amount of iodine sufficient to return the metabolism again to the normal condition. Every excess may thus be avoided with this method. Medicinal measures are especially successful in the parenchymatous form of thyroid hyperphasia at puberty, pregnancy and the menopause. A diffuse colloid degeneration provided no permanent degenerative changes have resulted may also be favourably influenced by medicinal measures.

Not much success is to be attained by medicinal measures unless the following points are attended to:- (1) The removal of all possible foci of infection. The teeth should be X-Rayed and a tonsillectony performed. The gastro-intestinal tract must receive proper attention. (2) The establishment of a proper hygienic regime both physical and mental, plenty of healthy outdoor exercise should be encouraged, and too streuous application to school work or other pursuits must not be permitted. (3) The establishment of a suitable diet of a plentiful caloric value but with a low protein content. Especially elements that tend to cause intestinal putrefaction should be avoided and emphasis laid on wholemeal products, coarse vegetables and foods that help to promote the efficient evacuation of the bowels. Milk especially soured milk is a valuable adjuvant to the dietary, not only because of its food value but also of its action as an intestinal antiseptic. The iodine treatment has mostly been administered in the form of the iodide of sodium or potassium for two to three weeks with a week's interval and continued for two to three months. The external application of iodine while a popular lay remedy is of no effect as iodine is only very slightly absorbed from the skin and is very liable to blister the skin. Similiarly the Unq. Hydrag. iodidi Rubra has been discontinued for similar reasons. Whatever method of thyroid

therapy is adopted small doses should in all cases be used so as to prevent symptoms of thyroid intoxication; such small doses being as efficacious and less dangerous than larger amounts. Plummer claims good results from the use of ~~thyroidin~~ thyroxin, the dosage being determined by the estimation of the basal metabolic rate as well as the quantity to maintain the individual at the approximate normal. The tincture of iodine in five minim doses is sometimes employed either alone or in conjunction with potassium or sodium iodide. Another splendid preparation is the syrup of the iodide of iron. This contains not only the necessary iodine but also serves as a valuable tonic. Its administration to pregnant women and children is to be strongly recommended. Cod liver oil besides being very nourishing has been shown to be efficacious in the treatment of goitre and is specially useful in children. Arsenic is a valuable adjuvant to thyroid treatment. Hertoghe claims that thyroid indication is more active and better tolerated when the blood is alkalised by the use of sodium bicarbonate. The use of intestinal antiseptics appears to be as efficacious as specific thyroid therapy. The simplicity of administration, its efficacy and the absence of the danger of inducing thyrotoxicosis bid fair to place specific thyroid therapy in a secondary role. The intestinal antiseptics in use are thymol, solol, and Betanapthol. Of these thymol has had the most extensive trial.

Its administration in large doses (gr.X) may be employed without fear of inducing toxic symptoms, provided all solvents of the drug such as fats, oils and alcohol are rigidly excluded. Occasionally a burning, itching sensation is experienced around the anus which readily yields to the application of zinc ointment. The success attending the use of vaccines either autogenous from the faeces or a stock staphylococcal or coli vaccine is one of the striking features of this method of treatment. Medical measures are however useless in cystic, fibrous, calcareous, and diffuse colloid goitres of more than three months duration. Every goitre which grows rapidly causes severe pressure symptoms and becomes sensitive to pressure should at once receive surgical attention. This brings us to the indications for operation in simple goitre, which may be conveniently summarised under the following headings:- (1) Where medicinal measures after a fair trial have failed. (2) Fibrous, cystic, calcareous and diffuse colloid goitres which have resisted medical treatment. (3) All goitres which are ~~practically~~ partially or wholly intratracheal. (4) All goitres causing pressure symptoms. (5) All goitres causing unsightly deformities. (6) All goitres secondarily complicated with hyperthyroidism. (7) In all cases where there is a suspicion of malignancy. The treatment of goitre by injections is a things of the past as the

procedure is attended with too much danger. The injection of substances such as carbolic and cromic acid is expected to produce a sclerosis of the gland, and finally to reduce the size of the goitre. This method is dangerous for several reasons. In the first instance there is no control over the fibrotic process nor anything to prevent a fibrosis once started to involve the whole gland in its destructive process. Furthermore haemorrhages and abscesses commonly follow in spite of the most rigid aseptic precautions. Lastly there is the grave danger always present of the injection into a vein, a procedure attended with rapidly fatal results. As has been demonstrated from the preceding arguments there is considerable room for the surgical treatment of goitre and according to C, H, Mayo[8] such a procedure should not be too long delayed. The method employed must necessarily vary with each case. Where pressure symptoms are present a ~~tension~~ division of the isthmus or in the case of a large goitre ~~tension~~ division of the muscles lying anteriorly to the goitre may suffice. Removal of the most prominent part of a lobe or a resection of both lobes may be practised according to the nature of the case. Apart form the goitre, surgery is employed for the removal of septic foci such as infected tonsils, decayed teeth and the correction of gastro-intestinal disorders. Should medicinal measures have failed and surgical treatment be

contra-indicated the use of the X Rays may be invoked. Its application like the injection treatment is attended with the risk that more of the gland may be destroyed than is aimed at, nor can a fibrotic process once started be prevented from invloving the whole gland in its destructive process. Large doses of X Rays are not necessary. Each lobe at first receives an exposure once a week for three weeks, then once in three weeks. The rays should not be hard and erythema of the skin must be avoided. As a guide and to prevent the development of myxoedema it is advisable to test the basal metabolism after six exposures.[9] As a final word it is essential that these patients be kept under observations and frequent examinations made. In the treatment of the fifty cases prophlactic measures as already outlined were adopted where necessary. Cases were divided into two groups, one group consisting of those in whom no gross permanent changes could be detected in the goitre. The other comprised goitres in which permanent pathological degenerations had taken place. In the later medical measures can only aim at the preservation of such thyroid tissue as may still be functionating. Now it has been shown by Walton that a combination of the intestinal and iodide treatment is more successful than either alone. Accordingly the gastro-intestinal tract must in the first instance receive adequate attention. This is done by the

administration of calomel to establish efficient evacuation and the disinfection of the bowel is further proceded by the administration of thymol so that intestinal disinfection proceeds uninterruptedly. Along with the thymol is adminstered thyroid extract, the use of which is gradually decreased and interrupted for one week in order to avoid thyrotoxic symptoms. Treatment must be pursued in this manner for at least three months, otherwise a relapse in a short time is bound to occur. In children with a goitre history in the parents the use of the syrupus Ferri Iodidi after such a course is to be strongly recommended. The onset of thyrotoxic symptoms from the use of the iodide in this preparation is avoided by the small dose of ℥ I first once in three months and then once in six months, and so on, so that there is a continual supply of iodide although small in quantity. Should a relapse threaten at any time during the treatment it is to be commenced all over again and continued. In case of grown-up goitrous individuals with a family history of goitre the use of Gr.V of the iodide once in three months, thence once in six months is to be strongly recommended. By spreading the use of this drug over such long periods there is no danger of thyrotoxic manifestations. In children below the age of ten years the use of cod liver oil after a course of treatment is very

useful as it is both nourishing, will prevent a relapse and may be continued for any length of time. For those with permanent degenerative changes a more vigorous form of treatment is necessary in the hope of conservating any thyroid tissue that may still be functionating. The disinfection of the bowel is carried out by the use of calomel and thymol. The disinfecting process is still continued by the use of thymol but now iodide takes the place of the calomel. The use of the iodide is to enable such thyroid tissue as may be left to avail itself of the presence of the drug, and possibly the iodide may have a beneficial influence on the degenerative changes. It should be noticed that all the time during which the thyroid medication or the iodide administration proceeds there is a continued disinfection of the bowel by the simultaneous use of the thymol. The establishment of a hygienic state of the bowel has many advantages:- (1) Any goitrigenous agents which may have gained entrance are thereby removed. (2) Absorption of any iodine in the food or in drugged form is rendered possible. (3) A secondary infection of the small intestine where rapid absorption takes place is thereby prevented. (4) The bacteriophagic activity in the bowel is thereby allowed free play.

SUMMARY AND CONCLUSIONS.

(1) Goitre is a world wide disease and as old as the history of mankind.

(2) No race, age or sex affords an immunity.

(3) The prevalence of the disease amongst women during the child bearing period is one of its striking features as during that period there result ideal conditions for the development and absorption of toxins. Owing to the strain thrown on the thyroid by the altered state of the maternal metabolism it is not in such a favourable position to come to the rescue of the bacteriophage.

(4) The occurrence in children at the breast is equally striking. Goitre in the mother plays a greater part in the occurrence of the disease in the offspring than its presence in the father. Such children possess an hereditary instability of the thyroid which leaves them without the smallest possible chances of escaping the disease.

(5) Occupation plays a part of considerable importance in the development of the disease as the endemicity reaches a high degree amongst those whose occupation brings them into contact with infected soil and water and that which leads to gastro-intestinal disorders.

(6) The endemic prevails to a great extent in rural districts, is never uniformly distributed throughout a goitrous area, but selects certain portions, groups of individuals or individual members of a group apparently at random.

(7) Whilst the disease appears to be rather common in mountainous regions no geological formation excludes its occurrence.

(8) It is not the chemical constituents of a geological distribution but rather the organic contents thereof which favours its presence.

(9) Soil and water act merely as a vehicle of the disease.

(10) Water analysis and experimental investigations have failed to assign to any chemical constituent the universal causal factor of the disease.

(11) Pathological changes in the thyroid take place early and occur in a step-like process and are not inconsistent with the action of a toxaemia in a series of waves.

(12) The more intermittent the exciting factor is in its action the longer are degenerative changes delayed and the greater are the possibilities of the gland to recover.

(13) Permanent pathological degenerative changes indicate that the gland's power of recovery is at an end.

(14) In terms of the bacteriophagic activity the

various phenomena of the endemic may be accounted for.

(15) Gastro-intestinal disorders and sepsis introduced into the alimentary tract from other foci impede the action of the bacteriophage.

(16) Not every case of intestinal toxaemia need develop goitre provided the bacteriophagic activity is such as to prevent the absorption of toxins in excess of that which can be combated by the thyroid secretion normally present in blood.

(17) The bacteriophage is the first line of defence, the thyroid the second.

(18) Whilst a deficiency or absence of iodine is an immediate cause of thyroid hyperplasia the ultimate cause is quite different. A deficiency in iodine is hardly a satisfactory explanation of the distribution of the endemic, nor of the high percentage of the disease in females.

(19) The absence of symptoms apart from the disfigurement, its insidious onset and chronic course are all very striking.

(20) The size of a goitre bears no relation to the production of pressure symptoms which are influenced by (a) the ~~sight~~ site of the enlargement, (b) the mode and direction of the growth, (c) the state of muscles and fascia of the neck.

(21) Whilst pressure symptoms may occur in an innocent

goitre they are more often associated with malignancy.

(22) Of the pressure symptoms dyspnoea is the most important and the most dangerous being in direct proportion to the amount of pressure on the trachea. Hoarsness of voice is a somewhat later and less constant symptom. Dysphagia is a much rarer symptom than either.

(23) Whilst acute infectious diseases such as influenza may be responsible for some cases of goitre, the chronic intoxications especially of intestinal origin play a greater role in the production of of the disease. The septic state of the circulation is evidenced by the phenomenon of "growing pains", and the catarrhal state of the urinary passages together with the frequent occurrence of bacteriuria.

(24) The blood picture of goitre is not sufficiently characteristic as to warrant a diagnosis therefrom.

(25) No organism, bacterial or protozoic has been discovered in the circulation or in the goitre itself pathognomonic of the disease.

(26) A goitre which has existed for more than three years is not likely to yield to medical measures which can only aim at the conservation of any thyroid tissue that may still be ~~fluctuating~~ functionating.

(27) The ascent and descent of the thyroid with deglutition is of great diagnostic importance

but may be absent in large pendulous goitres not the seat of malignant disease and present in a malignant goitre provided the fixed structures of the neck have not been invaded.

(28) The estimation of the basal metabolic rate is of value in determining the degree of thyroid deficiency as an early indication of a transition from hypo to the hyper active state and as a guide in treatment.

(29) In England goitre whilst prevalent in the limestone series is not confined to them and may be accounted for by the fact that that series has a greater distribution, is of greater fertility and is more inhabited, and contains a greater content of organic matter in virtue of their porosity than any other series.

(30) The role of preventative medicine is tremendous in the conquest of the disease.

(31) Treatment at an early stage is all important.

(32) In the iodide, thyroid or ~~thyroidin~~ thyroxin therapy small quantities are as efficient and less liable to cause thyrotoxic symptoms. The estimation of the basal metabolic rate determines the initial dosage, its effect, and the amount necessary for the maintenance dose.

(33) The use of intestinal antiseptics and other means of procuring a hygienic state of the bowel has

established beyond doubt the source and nature of the aetiological factor.

(34) A combination of intestinal antiseptic and specific thyroid therapy is more efficient than either alone.

(35) During the administration of ~~thyroid~~ thymol all fats, oils and alcohol are to be avoided to prevent poisoning.

(36) A recourse to surgery should not be too long delayed.

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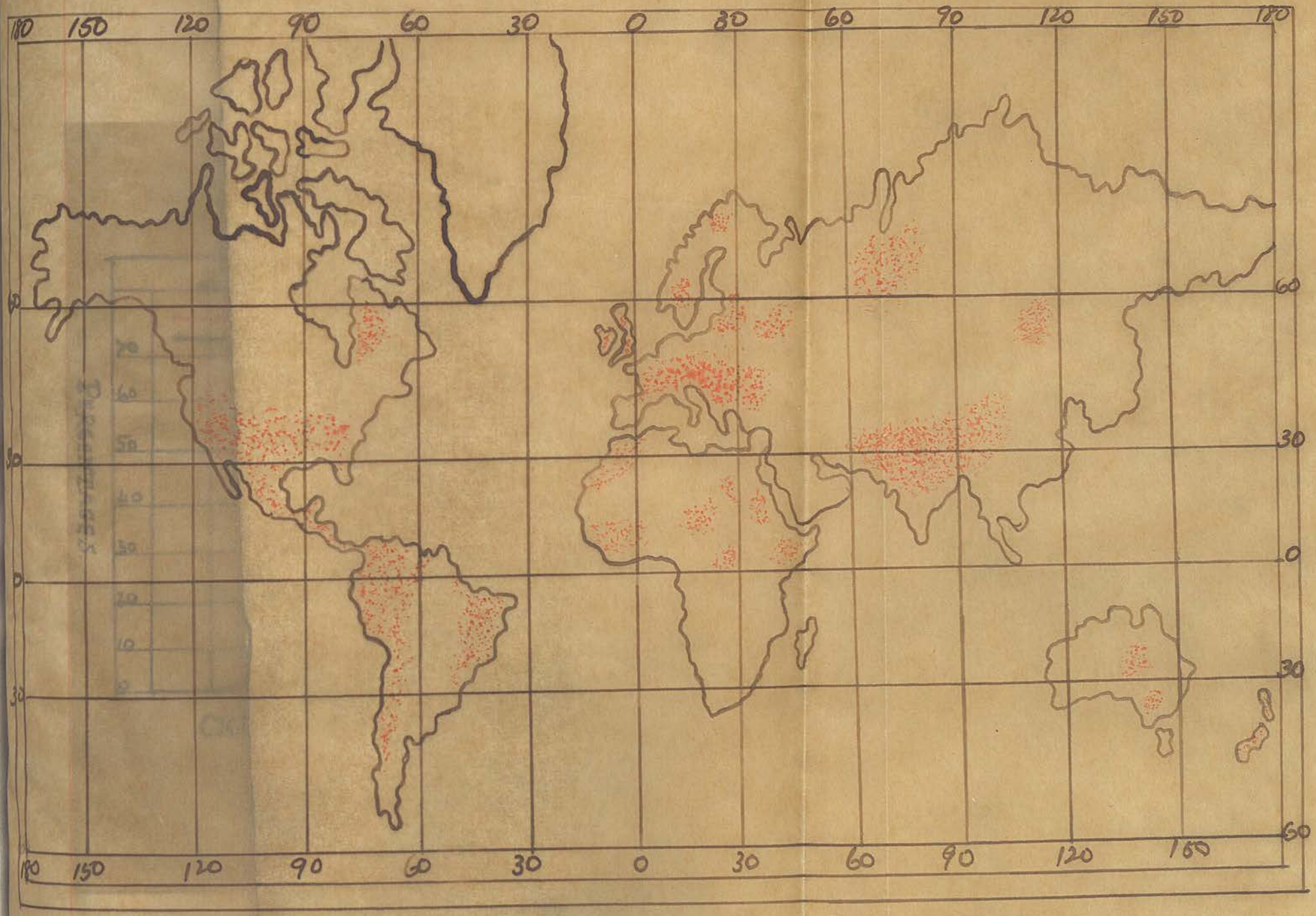


MAP OF THE WORLD SHOWING DISTRIBUTION OF ENDEMIC GOITRE.

(AFTER McCARRISON)

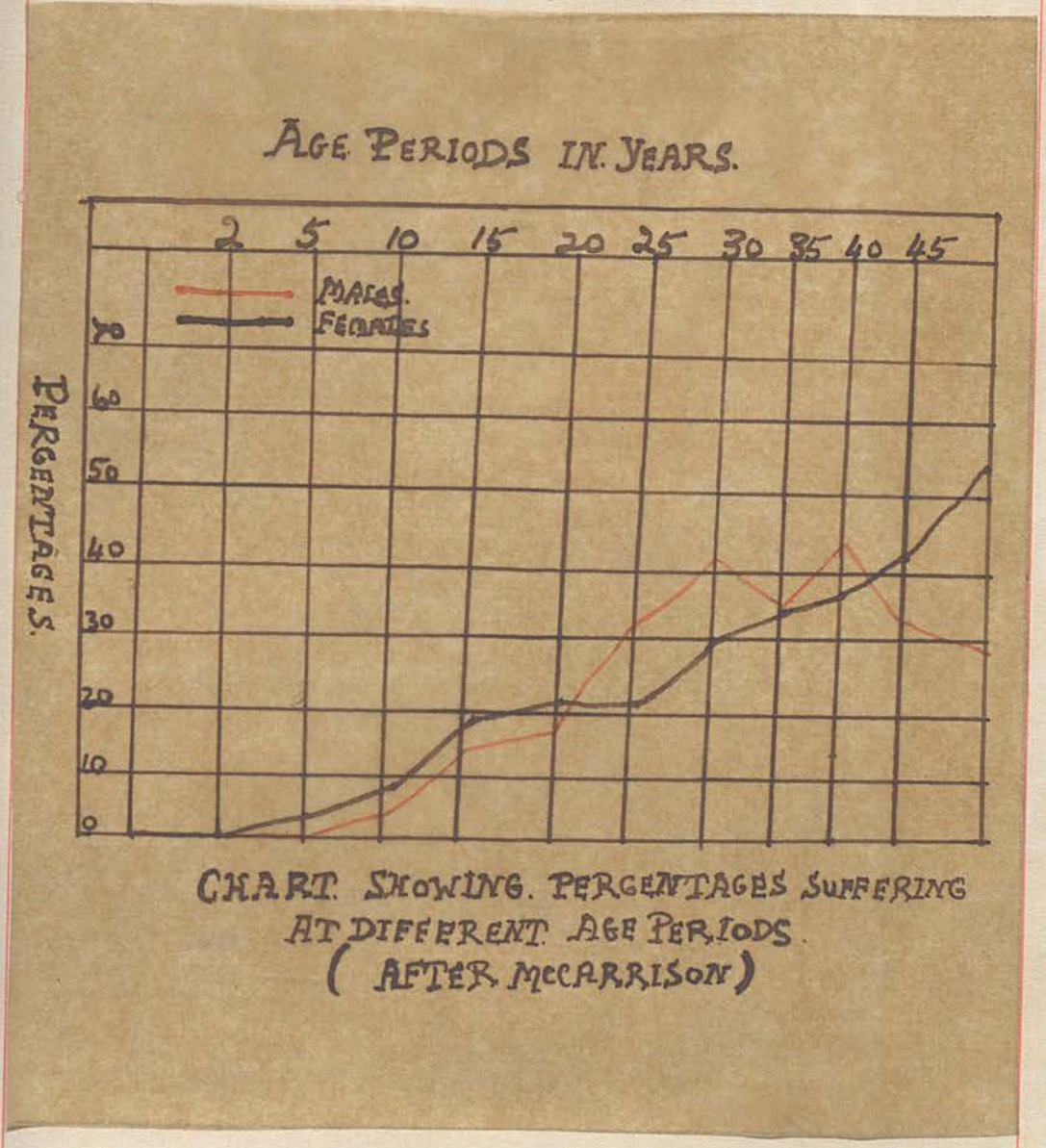
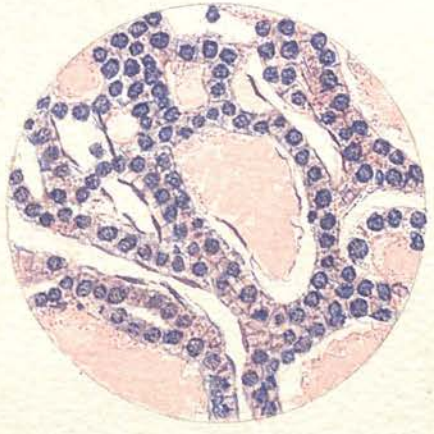


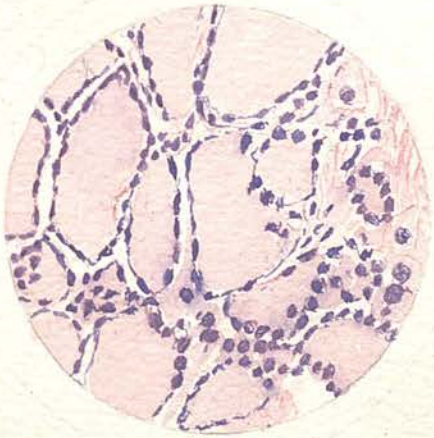
CHART SHOWING PERCENTAGES SUFFERING AT DIFFERENT AGE PERIODS.
(AFTER McCARRISON)

FIG. 1.



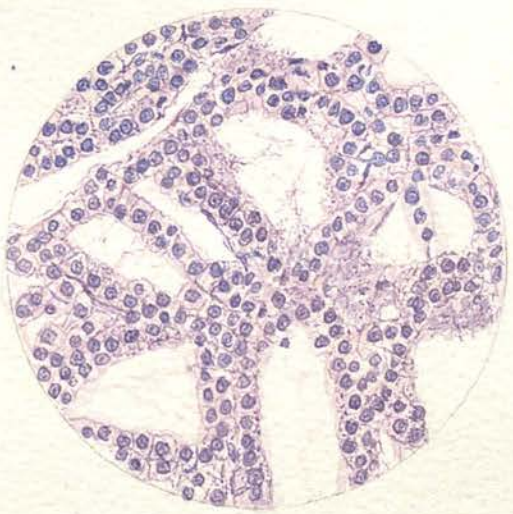
ADENOMA OF THE THYROID.

FIG. 2.



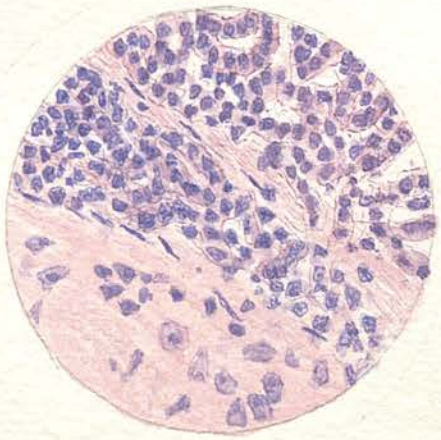
ADENOMA
OF THE
THYROID.

FIG. 3.



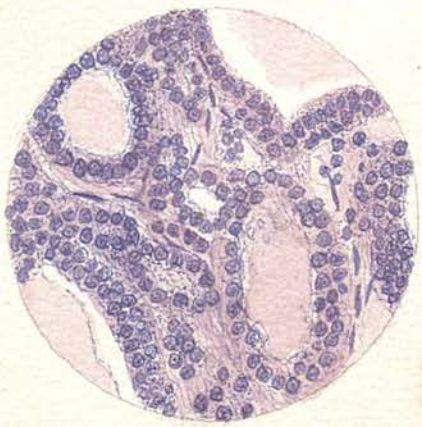
PAPILLARY ADENOMA
OF THE
THYROID.

FIG. 4.



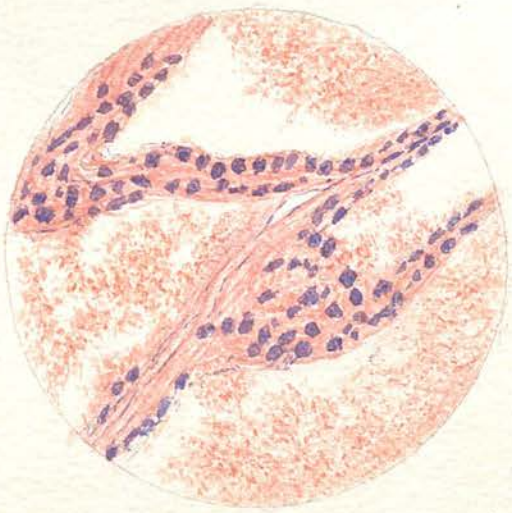
PAPILLIFEROUS
ADENOMA
OF THE
THYROID

Fig. 5.



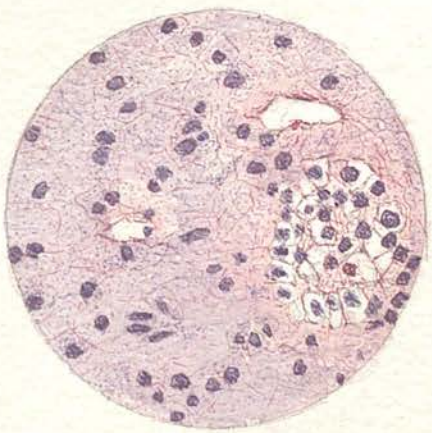
CYSTIC ADENOMA
OF THE THYROID

FIG. 6.



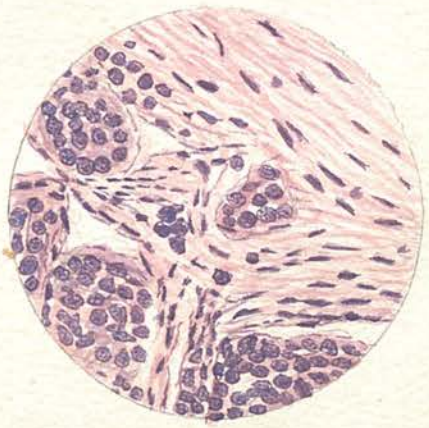
ATYPICAL ADENOMA OF THE THYROID.

FIG. 7.



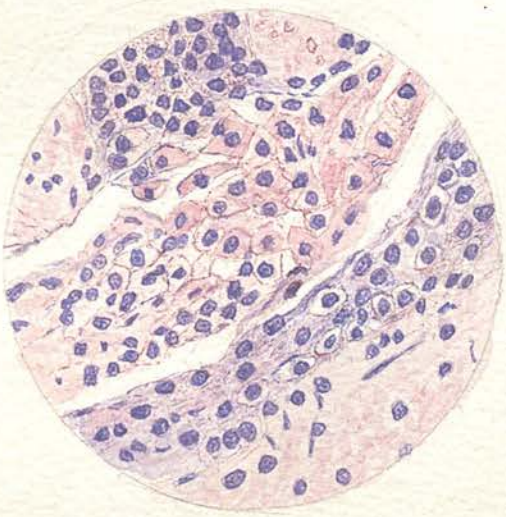
MYXOMA
OF THE
THYROID.

FIG. 8.



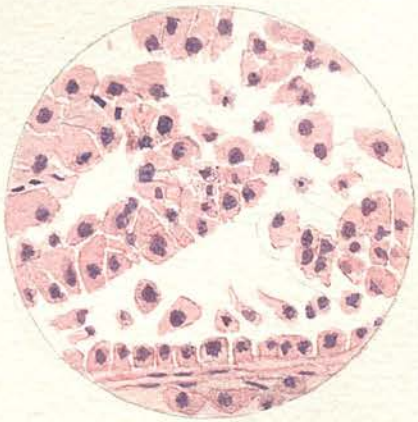
CARCINOMA OF THE
THYROID

FIG. 9.



SQUAMOUS CELLED CARCINOMA
OF THE
THYROID

FIG. 10.



ATYPICAL CARCINOMA OF
THE
THYROID

Fig. 11

"Colloid Goitre."

Fig. 12

"Intracystic Haemorrhage."

Fig. 13

"Fibrous Goitre."